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WAR MACHINE

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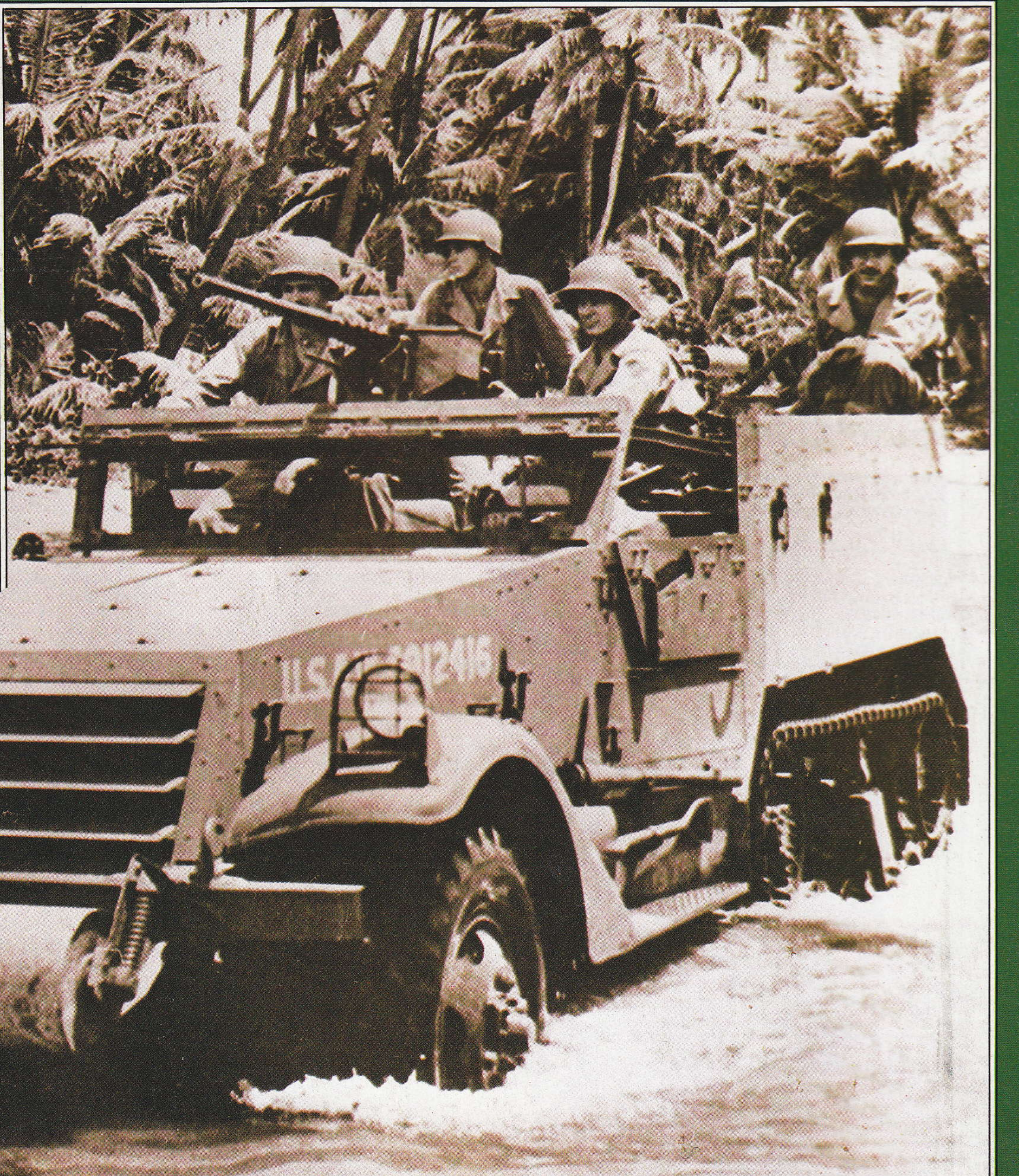
The Panzergrenadier Halftracks in Action

Operation 'Cobra'

The Role of the Halftrack



A fully illustrated guide to Halftracks of World War II

WAR MACHINE

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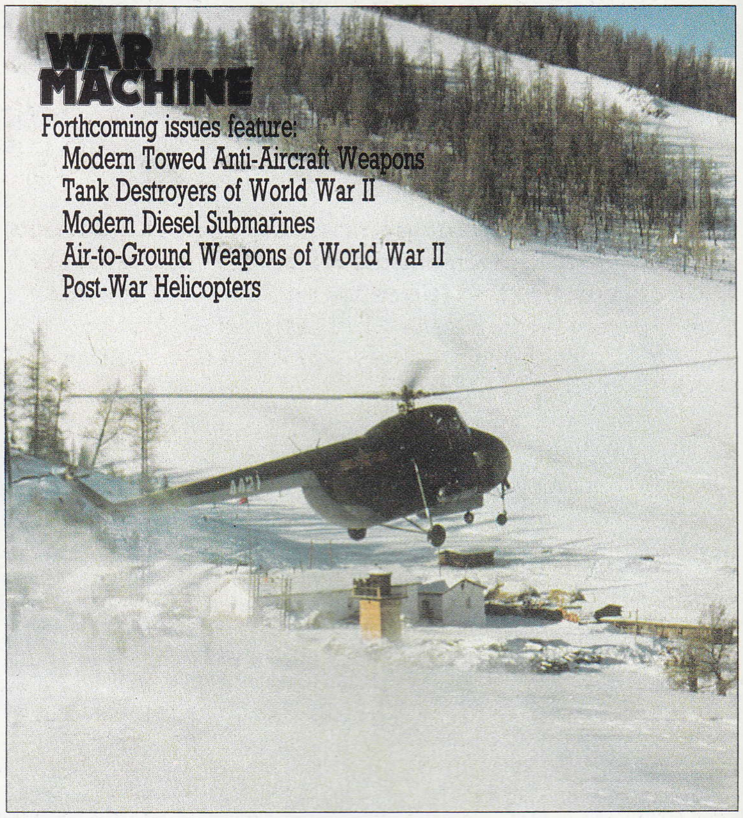

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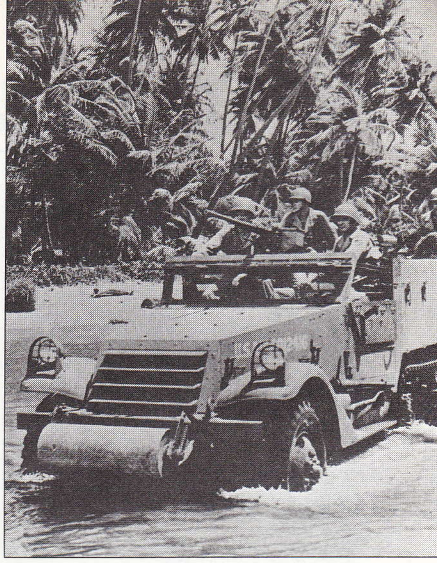
Halftracks of World War II

The need for the supporting arms to keep pace with the tanks was obvious to serious students of armoured warfare in the 1930s, but wheeled vehicles were roadbound and tracked support vehicles seemed an extravagance. Halftracks appeared to be the answer, and Germany and the USA built them by the thousand.



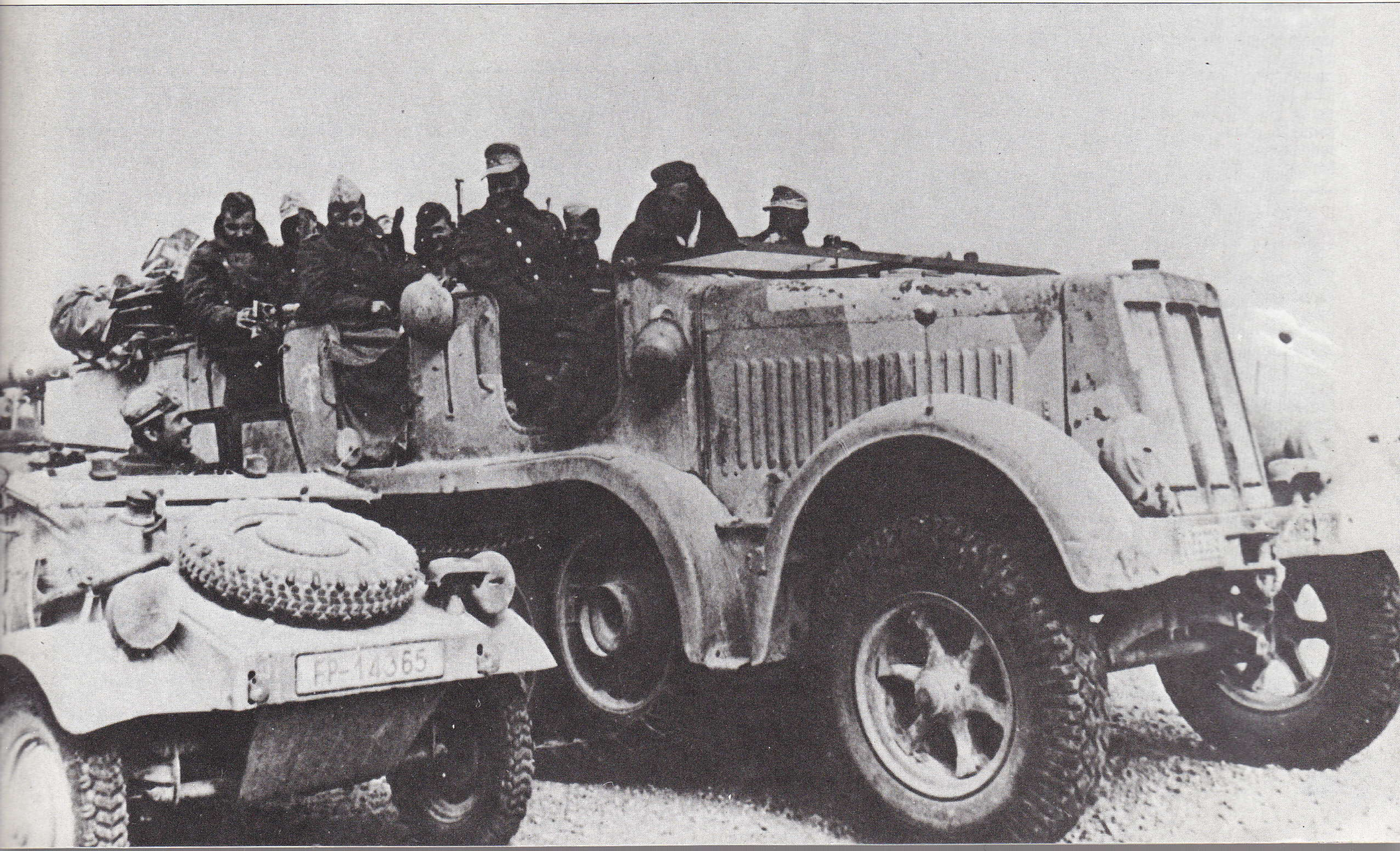
A Half-Track Car M2, one of the first of the many US Army halftracks, is seen here looking warlike off an island in the South Pacific and armed with a 0.50-in (12.7-mm) Browning heavy machine-gun. The anti-ditching roller can be clearly seen, and all the driver's armoured hatches are open for extra vision.

Between 1939 and 1945 the mobility of the halftrack imparted to all arms the ability to move at a pace that had not been even contemplated in 1918. Halftracks of all kinds moved the infantry, combat engineers, signallers and artillery around the battlefields of World War II at speeds not even the prophets of armoured warfare had envisaged. Instead of the long lines of marching infantry that advanced across the battlefields of 1918, the front-line soldier of 1945 moved in formations of halftracks carrying not only the vanguard of the infantry but also all the supporting arms.

The impact of the internal combustion engine on the battlefield is frequently quoted with the example of the tank, but it was soon learned that the tank by itself could not operate without support, of which the most important was that furnished by the infantry, followed by those of the engineers and artillery. With the latter two went all the other supply, command and communication functions, which had to have the mobility and speed of the tank. The halftrack was the best way of satisfying this operational requirement, and of all the nations involved in World War II the Soviet Union was alone in not producing such vehicles. Even the British, with their penchant for the tracked Bren Gun and Universal Carriers, were pleased to receive American halftracks, and the Soviet Union also used many when it suited them to accept such machines. The French developed many models of halftracks but had little chance to use the type in combat in 1940, mainly as a result of the rapid acceptance of armoured warfare principles by their German opponents. It was the Germans who made the best use of the halftrack's capabilities, and not even the massive output of the American arsenals can overshadow the impact that the German halftracks made at the time: even after a period of more than 40 years that impact still remains in the popular imagination. Thus although the Americans produced more of their halftracks than can be easily appreciated, the main emphasis in this study is on the German halftracks, from the tiny Kettenrad to the mighty SdKfz 9.

But one factor must be borne in mind when reading this study: in cost terms, weight for weight the halftrack was, and still is, more expensive than the tank. The high degree of technology required to make the halftrack reliable is such that each example was an engineering achievement purchased at high cost in time and facilities. If only a small sector of that effort had been diverted to other weapons or equipment things might have been different for the German armed forces.

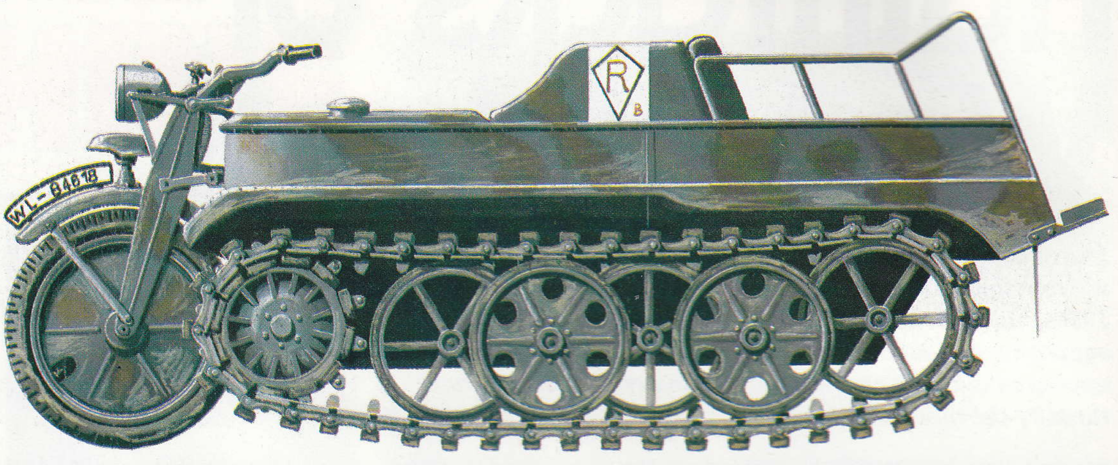
The bulk of the SdKfz 8 schwerer Zugkraftwagen 12t can be readily appreciated when seen alongside a Kübelwagen. This photograph was taken in North Africa during 1942 where the SdKfz 8s were used to tow 21-cm (8.26-in) heavy artillery.



GERMANY

SdKfz 2 kleines Kettenrad

The **SdKfz 2 kleines Kettenrad** (SdKfz standing for *Sonderkraftwagen* or special vehicle, and *kleines Kettenrad* (meaning small wheel-track or half-track) was developed initially for use by the new German army and Luftwaffe airborne and paratroop units, and was supposed to be a very light type of artillery tractor. It was originally intended as a towing vehicle for the specialized 3.7-cm Pak 35/36 anti-tank gun developed for the airborne role, and also for the range of light recoilless guns that had also been developed for use by these specialized troops.

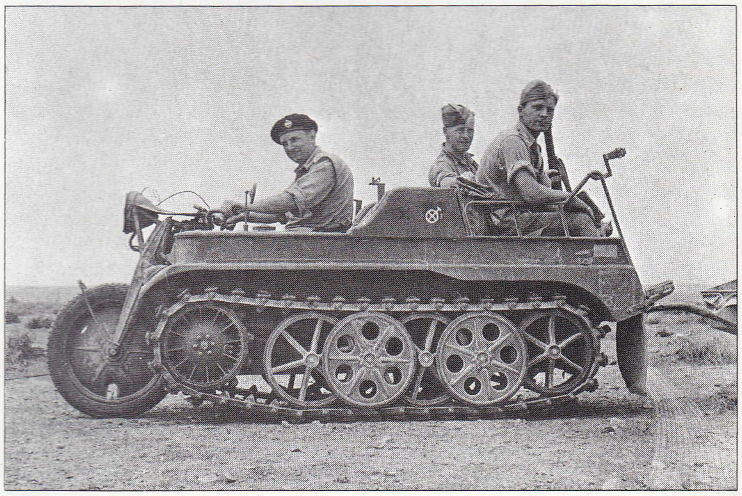


Above: The little SdKfz 2 kleines Kettenrad was originally intended for use as a light artillery tractor by airborne units, but after Crete these vehicles were more often used as light forward area supply vehicles for use over difficult terrain. Three men could be carried.

The first of these small tractors entered service in 1941. The initial service model was the **NSU-101**, a small but complex vehicle that could carry three men, including the driver who sat behind his steering bar close to the centre of the vehicle. The relatively long tracks took up much of the length of the vehicle on each side, and the engine was located under and behind the driver. Two men could sit at the rear, facing backwards, and the equipment to be towed was connected by a hitch at the rear. Apart from light artillery pieces the vehicle could also tow a specially-designed light trailer that could carry ammunition or fuel, and very often the seating for the two extra men was removed to make more room for cargo and supplies.

By the time the Kettenrad entered service its main intended use had passed with the mauling of the Luftwaffe airborne forces on Crete. Thereafter the German airborne formations fought as ground troops, and the need for their light artillery tractors was no longer pressing. Accordingly the Kettenrad was used mainly as a supply vehicle for troops operating in areas where other supply vehicles could not move without difficulty. While the little Kettenrads could carry out supply missions over seemingly impassable tracts of mud or sand they could not carry very much, and their towing capacity was limited to 450 kg (992 lb). This was often a drawback compounded by the fact that relatively few Kettenrads were built, so the few that were available were usually reserved for really difficult missions. At one point it was proposed that a larger version to be known as the **HK102** would be produced. This would have a larger 2-litre (122-cu in) engine (the original version had a 1.5-litre/91.55-cu in engine) that could power a larger vehicle capable of carrying five men or a correspondingly larger payload of supplies. It reached the design stage but got no further, since by 1944 it was finally appreciated that the Kettenrads were an expensive luxury that the German armed forces could no longer afford and the type went out of production.

Those Kettenrads in use in 1944 served up to the end, and there was even a specialized type for high speed cable-laying to link up command posts and forward positions. There were actually two variants of this cable-laying version, one for laying normal telephone cable (**SdKfz 2/1**) and the other for laying heavy-duty cable for large switchboards (**SdKfz 2/2**). Both mounted the cable drums above the centre of the vehicle on a steel framework and a signaller guided the cable off the drums and onto the ground using a cable guide.



British soldiers try out a captured SdKfz 2 kleines Kettenrad. The driver sat in a well between the two tracks, with the engine just behind him.

Specification

SdKfz 2
Crew: 3
Weights: 1200 kg (2,646 lb)
Powerplant: one Opel Olympia 38 petrol engine developing 26.8 kW (36 hp)
Dimensions: length 2.74 m (8 ft 11.9 in); width 1.0 m (3 ft 3.4 in); height 1.01 m (3 ft 3.8 in)
Performance: maximum road speed 80 km/h (49.7 mph)
Armament: none

GERMANY

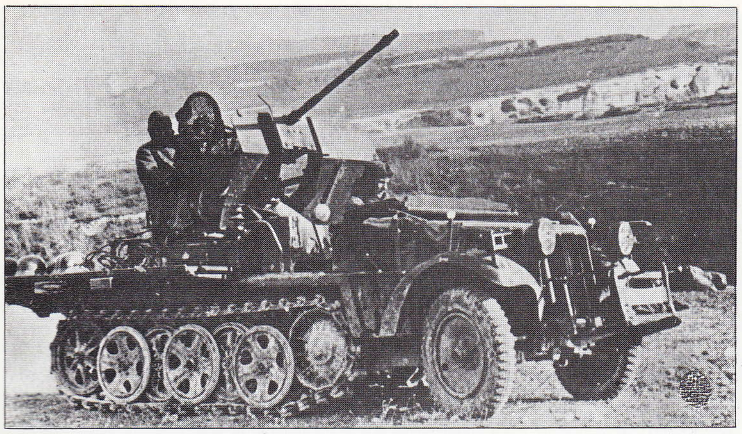
SdKfz 10 leichter Zugkraftwagen 1t

From the mass and weight of the 18-tonne SdKfz 9 the numerical sequence changed back to the lightest of the artillery tractors, the **SdKfz 10 leichter Zugkraftwagen 1t**. This light tractor had its origins in a 1932 army requirement, and the development work was carried out by Demag of Wetter-Ruhr. The first prototype was completed during 1934 and in 1937 the production model (the **D 7**) emerged. This remained in production until 1944 with its basic form virtually unchanged, and later attempts to replace this model never did get very far since the original was deemed more than adequate for its role.

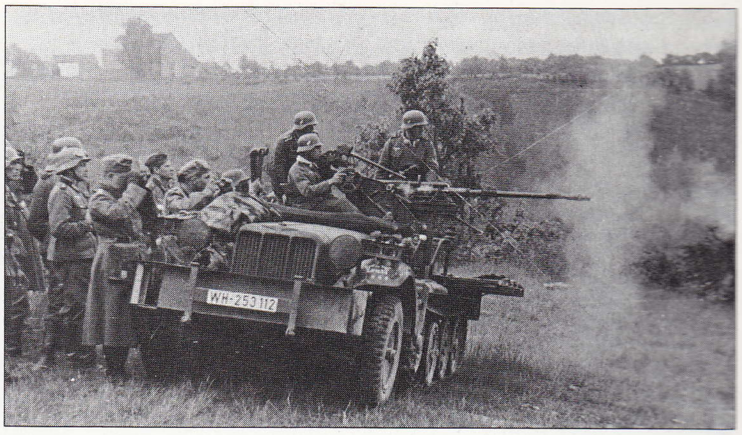
The task was to tow light infantry and other weapons, and to carry the weapon detachment of up to eight men. These weapons included the 3.7-cm (1.456-in) Pak 35/36 anti-tank gun, the 7.5-cm (2.95-in) leIG 18 infantry support gun, and the larger 15-cm (5.9-in) sIG 33 infantry gun. Other weapons towed included light anti-aircraft guns and later in the war the 5-cm (1.97-in) Pak 38 and 7.5-cm Pak 40 anti-tank guns. The basic vehicle was also used as the basis for the armoured SdKfz 250 series. All in all the SdKfz 10 was a very popular little vehicle that remained in demand by all arms throughout the war. Production was carried out at two main centres, one of which was the Sauerwerke in Vienna, but by 1943 production concentrated at the other main centre (the Mechanische Werke at Cottbus) when the Vienna plant switched to other things. By German terms the production totals were large, more than 17,000 being completed.

By far the most numerous of this production total was the basic tractor but as usual this vehicle was used for other things. The first variants were produced as a reflection on the expected nature of the coming war for three variants, the **SdKfz 10/1, SdKfz 10/2** and **SdKfz 10/3** were all produced as chemical warfare vehicles: the first was a specially-equipped chemical recon-

SdKfz 10 leichter Zugkraftwagen 1t tractors are being used here in their intended role to tow 5-cm (1.97-in) Pak 38 anti-tank guns. The vehicles have their canvas covers stowed, and the gun crews' kit and equipment is stowed at the vehicle rear.



This SdKfZ 10/4, a variant of the basic 1-tonne tractor, is fitted with a 2-cm (0.79-in) Flak 30 complete with its curved shield and with the sides folded down for action. Some of these vehicles were fitted with armoured cabs to protect the driver. Extra ammunition was usually carried in a towed trailer.



The light SdKfz 10 could mount either the 2-cm (0.79-in) Flak 30 or the Flak 38. These guns could be used against ground targets if required, as seen here. This is an SdKfz 10/4 with a Flak 30 and with the sides folded down to provide a firing platform.

naissance vehicle, while the second and third were decontamination vehicles carrying equipment-cleansing solutions in drums or a tank. Very few of these special vehicles appear to have been produced, and no records survive of any ever being encountered. It was different with **SdKfz 10/4** and **SdKfz 10/5**, for these two vehicles were produced to mount single-barrel 2-cm light anti-aircraft guns: the SdKfz 10/4 carried the Flak 30 and the SdKfz 10/5 the faster-firing Flak 38 from 1939 onwards. These two vehicles were so arranged that their sides and rear could fold down to form a working platform for the gun crew, and many examples that operated in direct support of ground formations (as opposed to the vehicles used by the Luftwaffe) were fitted with extra armour over the driver's position.

As was usual at the time, there were unofficial modifications to the SdKfz 10 series to carry local 'field fit' weapons. A not uncommon weapon so fitted was the 3.7-cm Pak 35/36 anti-tank gun, which was usually mounted to fire forward while still fitted with its gun shield. A less common weapon was the later 5-cm Pak 38 carried in a similar manner, but these were less frequently encountered.

Specification

SdKfz 10
Crew: 8
Weight: 4900 kg (10,803 lb)
Powerplant: one Maybach HL 38 or 42 6-cylinder petrol engine developing 74.6 kW (100 hp)
Dimensions: length 4.74 m (15 ft 6.6 in); width 1.83 m (6 ft); height 1.62 m (5 ft 3.8 in)
Performance: maximum road speed 65 km/h (40.4 mph); range 150 km (93 miles)
Armament: see text

GERMANY

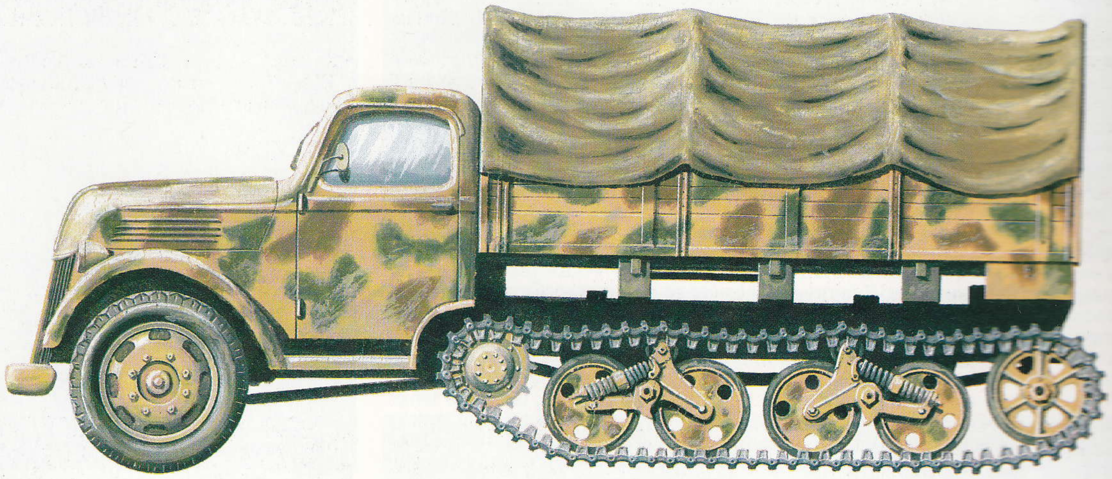
Maultier

The first winter of the war in the USSR (1941-2) demonstrated to the German army that most of its wheeled transport was completely unable to deal with the dreadful muddy conditions produced during the freeze-thaw weather that marked the beginning and end of the Russian winter. During these conditions it was only the halftracks that could make any headway, but to divert the precious halftracks from their operational purposes to carry out the mundane day-to-day supply functions was obviously uneconomic, so it was decided to produce low-cost halftrack trucks. This was done quite simply by taking Opel and Daimler-Benz trucks from the production lines and removing their rear axles. In their place went new driveshafts connected to tracked assemblies made from PzKpfw II running wheels and tracks. In itself this was a considerable economic advantage since the PzKpfw II was then going out of production and existing capacity could be retained, making the truck conversion an even more cost-effective venture.

The new halftrack trucks were provided with the name **Maultier** (mule). In the end the conversions used mainly Opel Typ S/SSM trucks, and in service they were generally a success although they tended to lack the overall mobility of the 'proper' halftracks. Not surprisingly, their use was confined to the Eastern Front, and the vehicles were used mainly for routine supply purposes.

Not content with a good thing, the Germans as ever were forced to employ the Maultiers for yet another purpose. The German Nebelwerfer (rocket) batteries had become an established part of the army artillery system by late 1942, and it was decided that the Panzer formations should have their own dedicated rocket units. At that time most Nebelwerfer units used towed launchers, so in order to keep up with the Panzers a self-propelled version was required. The halftrack was the obvious choice as a starting point, but as none could be allocated the Maultier was pressed into use.

The basic truck was provided with a fully armoured cab, engine cover and hull. On the hull roof a 10-barrel launcher known as the 15-cm Panzerwerfer 42 was placed. This launcher had 270° of traverse and 80° of elevation, and it fired the 10 rockets in a ripple. The army ordered 3,000 of these conversions with the understanding that production would eventually switch to the sWS when production totals of the latter allowed, which they never did (apart from a small batch of prototypes). The first of these Maultiers was used during 1943, and had a crew of three. The rockets were carried in the launcher, with reloads in compartments along each side of the lower hull. A machine-gun was usually carried. Some of these armoured Maultiers were produced without the launcher and were used to carry extra rockets for the launcher vehicles, and some of these were used by units other than the Nebelwerfer batteries as front-line ammunition supply vehicles, although their armour was proof only against small arms projectiles and shell splinters.



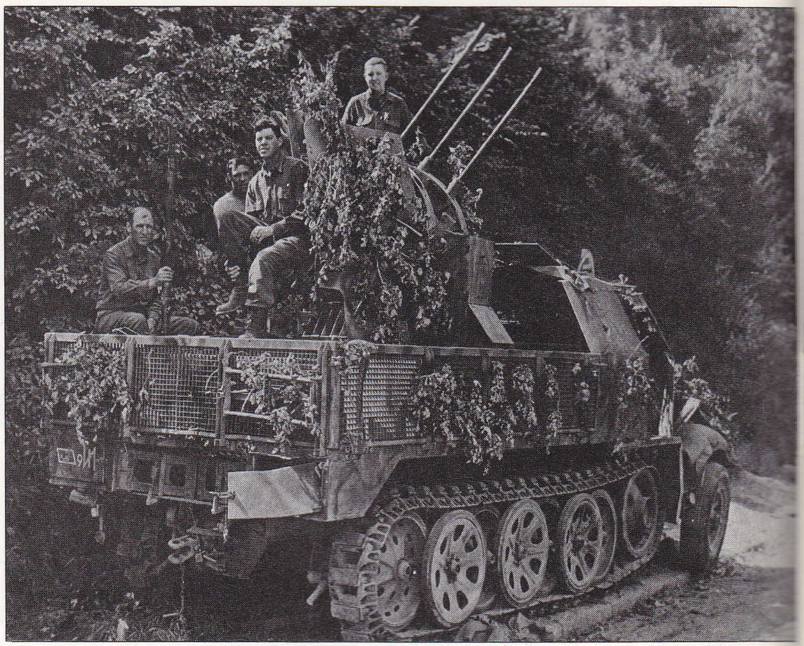
The Maultier was a makeshift conversion of an Opel truck into a half-tracked truck for use as a supply vehicle in forward areas. The schwerer Wehrmachtschlepper was meant for this role, but could not be produced in sufficient numbers so the Maultier was produced.

Specification

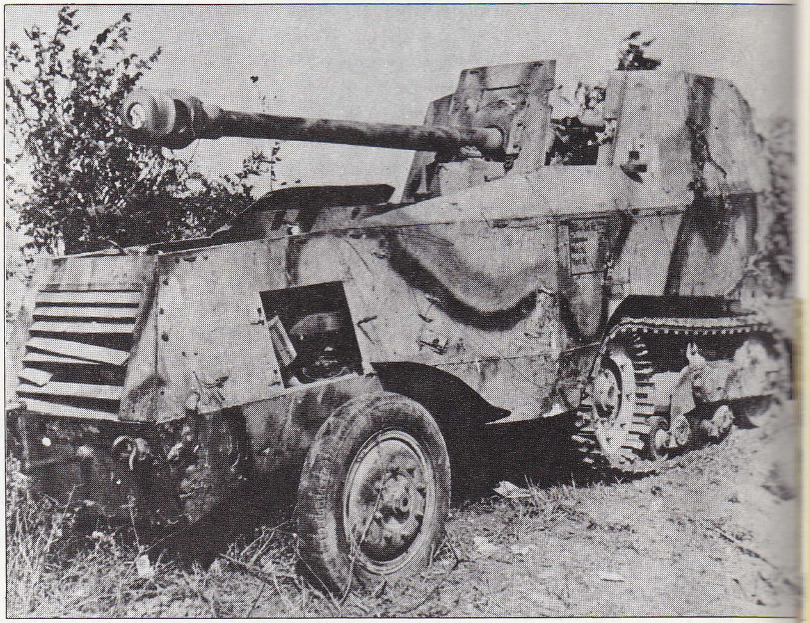
Maultier (rocket launcher)
Crew: 3
Weights: 7100 kg (15,653 lb)
Powerplant: one 3.6-litre 6-cylinder petrol engine
Dimensions: length 6.0 m (19 ft 8.2 in); width 2.2 m (7 ft 2.6 in); height 2.5 m (8 ft 6 in)
Performance: maximum road speed 38 km/h (30 mph)
Armament: see text

The Role of the Halftrack

Half-tracked vehicles were used to enhance the mobility of almost every service arm, from infantry and artillery to engineers and medical staff. Their use as armoured personnel carriers (APCs) heralded the development of modern mechanized infantry tactics.



A captured 2-cm (0.79-in) Flakvierling 38 SdKfz 7/1 anti-aircraft vehicle lies by a hedgerow in Normandy. When in action the sides of this vehicle were folded down to act as a 'working platform' around the gun. This vehicle has an armoured cab to protect the driver; the crew had no such protection.



A German conversion of a French Somua MCG halftrack was made to accommodate an armoured hull and mount a 7.5-cm (2.95-in) Pak 40 anti-tank gun. These conversions were carried out in France ready for the 1944 Normandy campaign, where this example was knocked out. Probably 16 such modifications were carried out.

During World War II the main weapon of every mechanized army was the tank, and it has maintained this ascendency to this day. Its combination of firepower, protection and mobility made the tank the main cutting edge of massed attacks, and the main support for defence. However, the fact remained that it could not operate in isolation. Anyone who travels inside a tank under even moderate combat conditions will soon learn that his view is strictly limited. All that can be seen of the world outside the armoured carapace has to be observed through the narrow confines of periscopes, weapon sights and other limited viewing devices.

Thus tank commanders had to be provided with some form of observation outside the vehicle, and it was not too long before this role was undertaken by specialized infantry units travelling with the tanks. These infantrymen acted as the eyes and ears of the tank commander, relaying information and combat data to the crews, originally by manual signals such as flags and later by radio or even telephones mounted on the outside of the tank. The infantry could look out for targets ahead, warn of obstacles in dead ground, keep an eye out for minefields and hidden anti-tank weapons and generally keep enemy tank-killing infantry squads away.

The problem for the infantry was that to fulfil these tasks adequately they had to keep up with the fast-moving tanks. Early experiments in carrying infantry in trucks soon demonstrated that while the trucks theoretically had the required speed they did not have the mobility to cross rough terrain that the tanks often traversed, and the trucks also lacked the protection that even thin armour could provide against small-arms fire and shell splinters. When tanks co-operated with truckborne infantry they usually left the infantry far behind in a very short time.

What was wanted was a vehicle that could keep up with the tanks, provide some form of protection for the occupants, and hopefully also act as a weapon platform. The ideal solution would have been to have the infantry carried in a fully-tracked vehicle, but this solution was initially discarded when it was realized that the infantry vehicles would spend a great deal of their time travelling along paved roads and that contemporary track development was still at a point where speeds were low and track life relatively limited. Another factor against the fully-tracked vehicle was that up till World War II tracked steering systems were still cumbersome and could not provide the degree of manoeuvrability demanded. The infantry had to wait until well after World War II before the fully-tracked armoured personnel carrier became a viable service equipment.

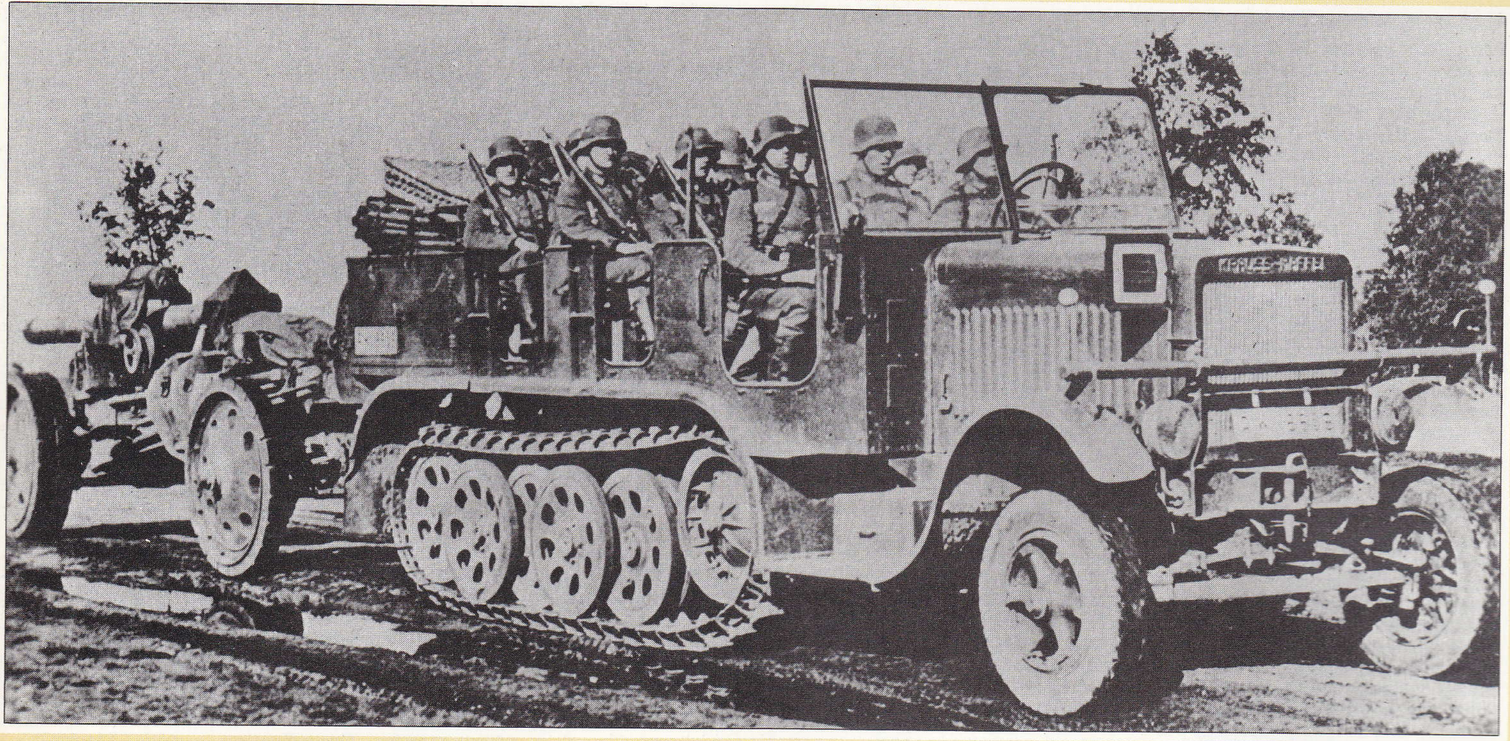
Thus an interim between the truck and the fully-tracked vehicle was sought, and indeed found in the halftrack. The halftrack, or semitrack, as it is sometimes known, could combine the mobility provided by the fully tracked drive system with the steering system of the wheeled vehicle. As the type was relatively light, it was not always necessary to make use of heavy steel tracks, so the rubber or rubber-based tracks of the type developed by Alexandre Kégresse could be used. During the 1920s and 1930s many nations developed the halftrack concept, most of them to the point where they could be placed into production for the armed forces, and many of these types are included in this study.

In the main the halftracks were issued to formations known as mechanized infantry, although the name varied from nation to nation: for instance, in Germany they were known as *Panzertruppen* and later *Panzergrenadiere*. The proportion of mechanized infantry to tanks varied somewhat, for some nations decided to go 'tank heavy' and used two tank battalions with one battalion of mechanized infantry while others had balanced 'one for one' proportions; some armies even had more mechanized infantry than tanks, and the proportions varied not only nationally but according to terrain. In large open areas such as the North German plains more tanks than infantry could be used, but once tanks approached built-up areas the numbers of infantry increased.

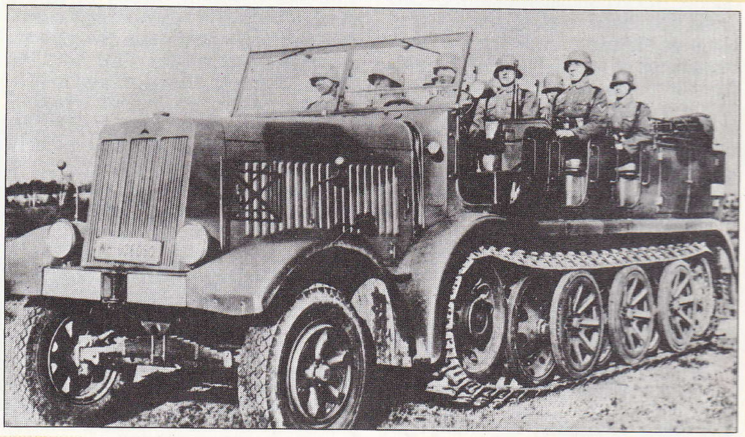
Once mechanized infantry were on the scene it was not long before they were joined by combat engineers who built bridges, demolished obstacles, cleared mines and generally kept up the momentum of armoured moves. They too often used halftracks to move forward and to carry or tow their heavy equipment, and if the engineers were mobile so were the artillery. During World War II self-propelled artillery was not common, most guns and howitzers being towed. Here the halftrack could be used to advantage to keep pace with the tanks, but since the artillery was a supporting arm that rarely had to move directly in the front line there was less need for armour. Thus many halftracks used as artillery tractors and ammunition carriers were little more than halftracked trucks with no armour at all. Armoured artillery tractors were usually used to tow anti-tank guns, for anti-tank units obviously had to operate directly in the face of the enemy. However, some artillery halftracks that also used armour were the mobile forward observation posts. These usually travelled with the tanks to call down supporting fire when needed, and they too required armour for protection.

With the main combat arms of mechanized infantry, artillery and combat engineers mounted in highly mobile halftracks, it was not long before the rest of the supporting arms travelled in them too. Commanders obviously had to keep pace with their forces and halftracked command and communication posts became standard. Recovery units used the mobility of the halftrack to carry their cranes and other recovery equipment, and halftrack ambulances become commonplace.

Thus by the end of World War II whole formations moved on halftracks, the US Army probably being the best example of this tendency. But with this large-scale move towards protected mobility came an unforeseen shift in combat tactics and capabilities. Many of the halftracks sprouted armament of all kinds, ranging from machine-guns to heavy guns and howitzers. Halftracks became not just weapon carriers but mobile platforms from which the weapons could be used directly. This was particularly true with infantry: the troops no longer had to use their carriers only as 'battle taxis' from which they dismounted to fight, but instead used their halftracks as mobile platforms from which they could direct their fire, in both attack and defence. Thus tactics were introduced that allowed the halftracks to move forward firing as they went to deliver their infantry loads directly onto enemy positions or else move through them to wreak havoc in the rear areas. They did not do this in isolation, for they still travelled with the tanks, but at times it was not the mechanized infantry who supported the tank but the tank that supported the infantry. By 1945 the halftrack had thus made possible radical alterations in tactics, and this presaged the balanced battle groups and combat teams of today, where one arm cannot operate in isolation but only as part of a balanced and co-ordinated team.

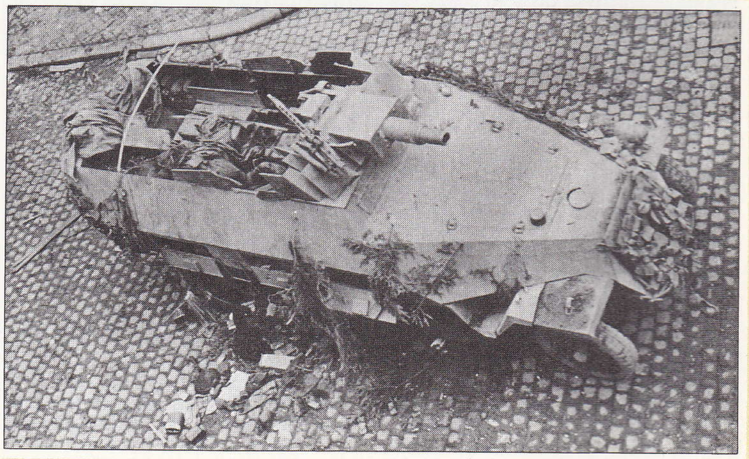


This halftrack tractor was known as the Krauss-Maffei KM8, and was the forerunner of the mittlerer Zugkraftwagen 8t (SdKfz 7) series. This early model is seen here towing a 15-cm (5.9-in) sFH 18 medium field howitzer and full crew. Taken around 1935, this is a typical propaganda picture of the period.



This standard SdKfz 7 8-tonne artillery tractor has a full gun crew on board. A canvas tilt could be used to provide overhead weather protection for the personnel, but this was usually stowed at the rear to improve all-round vision to guard against air attack. Stores and ammunition could be carried at the rear.

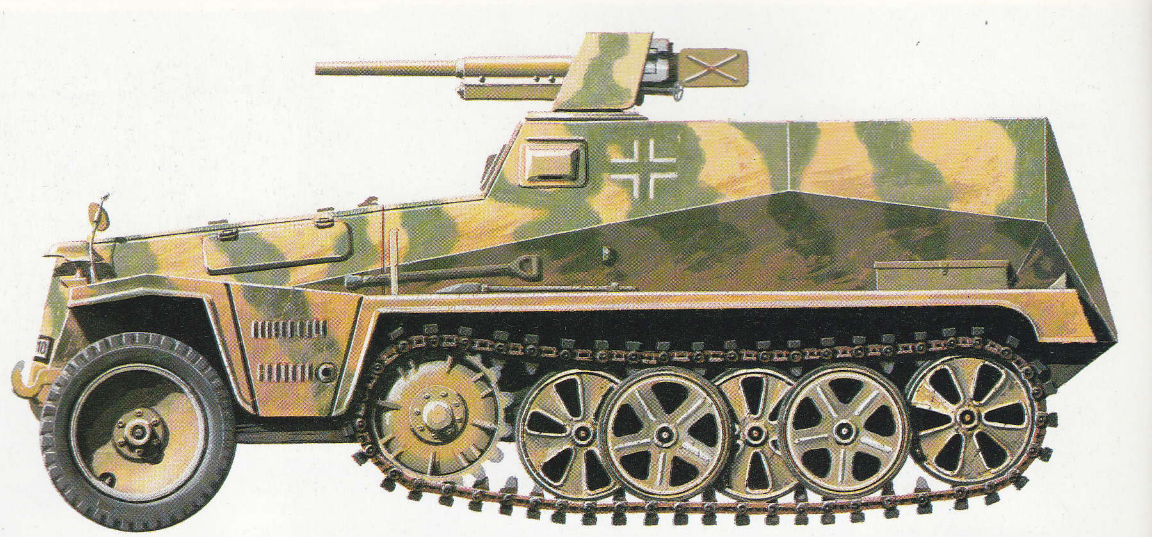
The Soviet Union supplemented its own range of halftracks with vast numbers of American vehicles shipped under the Lend-Lease scheme. Here a Red Army M3 drives into Sofia during the Soviet invasion of Bulgaria in September 1944.



This SdKfz 251/9 was knocked out at Stavelot on 21 December 1944 during the Ardennes fighting. It is armed with a short 7.5-cm (2.95-in) assault gun, and a 7.92-mm (0.312-in) MG 42 is also carried. The unfortunate gunner is still on board next to his gun, killed by a rifle grenade.

GERMANY

SdKfz 250 leichter Schützenpanzerwagen



The vehicle that was to become the **SdKfz 250 leichter Schützenpanzerwagen** series had its origins in the same operational requirement produced during the mid-1930s that led to the SdKfz 251 series. It was intended that there would be both 1-tonne and 3-tonne halftracks to provide mobility for the infantry and other units operating with the Panzer divisions, and the 1-tonne model became the SdKfz 250.

The SdKfz 250 was first produced by Demag AG of Wetter in the Ruhr, although later other concerns were also involved in manufacture. The vehicle was based on the chassis of the **SdKfz 10 leichter Zugkraftwagen** 1-tonne vehicle, but featured an armoured hull with an open top to accommodate the crew of five men plus the driver. The first examples were produced during 1939, and the SdKfz 250 first went into action during the May 1940 campaign in France. Compared with its larger counterpart, the SdKfz 251, the SdKfz 250 halftrack was built and used on a much smaller scale but the type's production total was impressive enough (5,930 were made between 1942 and 1944) and by the time the war ended no less than 14 official variants had been produced (plus the usual crop of unofficial variants), and from 1943 onwards production modifications were introduced to the hull shape to assist manufacture while at the same time cutting down the amount of raw materials required. Armour thickness ranged from 6 to 14.5 mm (0.24 to 0.57 in).

The main run of SdKfz 250 vehicles commenced with the **SdKfz 250/1**, which had a crew of six men and carried two machine-guns. There followed a number of models equipped for either radio (**SdKfz 250/3**) or telephone (**SdKfz 250/2**) communications, and a variety of weapon-carrying variants. These were armed with all manner of weapons from an 8.1-cm (3.189-in) mortar (**SdKfz 250/7**) to a 2-cm anti-aircraft cannon (**SdKfz 250/9**). Perhaps the oddest of these weapon carriers was the **SdKfz 250/8**, which appeared to be rather overloaded with a short 7.5-cm (2.95-in) tank gun (from the early versions of the PzKpfw IV tank) allied with a co-axial/ranging 7.92-mm (0.312-in) MG34 or MG42 machine-gun. There were two variants that were allocated their own special designation numbers. One was the **SdKfz 252** which was supposed to be a special ammunition carrier towing a trailer; the reshaped and fully-enclosed interior was meant to carry ammunition for *Sturmgeschütz* (assault gun) batteries, but only a few were made before it was realized that the ordinary SdKfz 250 could carry out the role just as well and the SdKfz 252 was thus replaced by the **SdKfz 250/6** which could carry 70 7.5-cm rounds. The other special version was the **SdKfz 253** which acted as an observation post for the *Sturmgeschütz* batteries and was given a special radio 'fit'.

Other SdKfz 250 variants included the **SdKfz 250/9**, a special turreted version for the reconnaissance role; the **SdKfz 250/12** range-finding and artillery survey model; light anti-tank models armed with either a 37-mm (1.456-in) anti-tank gun (**SdKfz 250/10**) or a special 'taper-bore' 2.8-cm (1.1-in) heavy anti-tank rifle (**SdKfz 250/11**); and various types of command and communication models. Unofficial versions mounted a 2-cm anti-aircraft cannon, and there was at least one attempt to mount a 5-cm (1.97-in) anti-tank gun.

The SdKfz 250 series were popular little halftracks, and they remained in production right up till the end of the war. They were expensive to produce, but they were used on every front and in service proved reliable and sturdy.

The SdKfz 250/10 was armed with a 3.7-cm (1.456-in) Pak 35/36 anti-tank gun, and was just one of a long string of variants of this light armoured carrier. Other versions carried machine-guns and even 7.5-cm (2.95-in) assault howitzers (the SdKfz 250/8).

Specification

SdKfz 250
Crew: 6
Weight: 5380 kg (11,861 lb)
Powerplant: one Maybach HL 42 6-cylinder petrol engine developing 74.6 kW (100 hp)
Dimensions: length 4.56 m (14 ft 11.5 in); width 1.945 m (6 ft 4.6 in); height 1.98 m (6 ft 6 in)
Performance: maximum road speed 59.5 km/h (37 mph); road range 299 km (186 miles); gradient 24°; fording 0.75 m (29.5 in)
Armament: see text

GERMANY

SdKfz 11 leichter Zugkraftwagen 3t

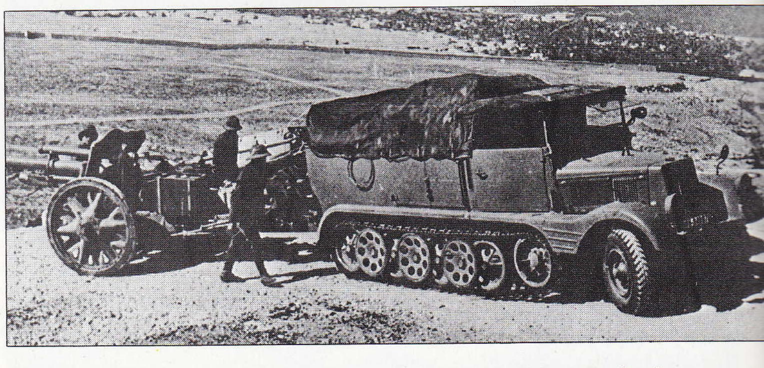
The **SdKfz 11 leichter Zugkraftwagen 3t** series had a somewhat difficult early development life, for the first versions that appeared in early 1934 were produced by two firms, Hansa-Lloyd and Goliath who later combined to form Borgward AG. For various reasons development of these early vehicles passed to Hanomag of Hanover, which became responsible for the series from then onwards, and by 1939 the SdKfz 11 leichter Zugkraftwagen 3t was in full production.

The basic SdKfz 11 was intended for use primarily as an artillery tractor, and once in service it became a standard tractor with 10.5-cm (4.13-in) leFH 18 field howitzer batteries, and was later used to tow 7.5-cm (2.95-in) Pak 40 anti-tank guns. In fact the SdKfz 11 was so successful with the leFH 18 batteries that the larger SdKfz 6 which was also meant to tow these howitzers was phased out of production in favour of the lighter (and less expensive) tractor. The SdKfz 11 tractors were also used by the Luftwaffe to tow light flak weapons such as the 3.7-cm (1.456-in) Flak 36 and 37, and it was by the army's Nebelwerfer (literally smoke-thrower) batteries that the SdKfz 11 was mainly used.

Despite their name the Nebelwerfer units were primarily rocket troops firing their missiles to bolster artillery barrages. The SdKfz 11s used with these batteries not only towed various multi-barrel launchers but also carried spare rockets, launcher frames for the statically-emplaced launchers and the crews to carry out the fire missions. Since the Nebelwerfer units were supposed to retain their smoke-producing skills for laying down smoke screens at times, some SdKfz 11s (the **SdKfz 11/1** and **SdKfz 11/4** models) were fitted with smoke-generating equipment but this could usually be removed for the more usual rocket-firing duties. These smoke-generating models had a crew of only two, compared with the nine that could be carried when the vehicle was used as a tractor.

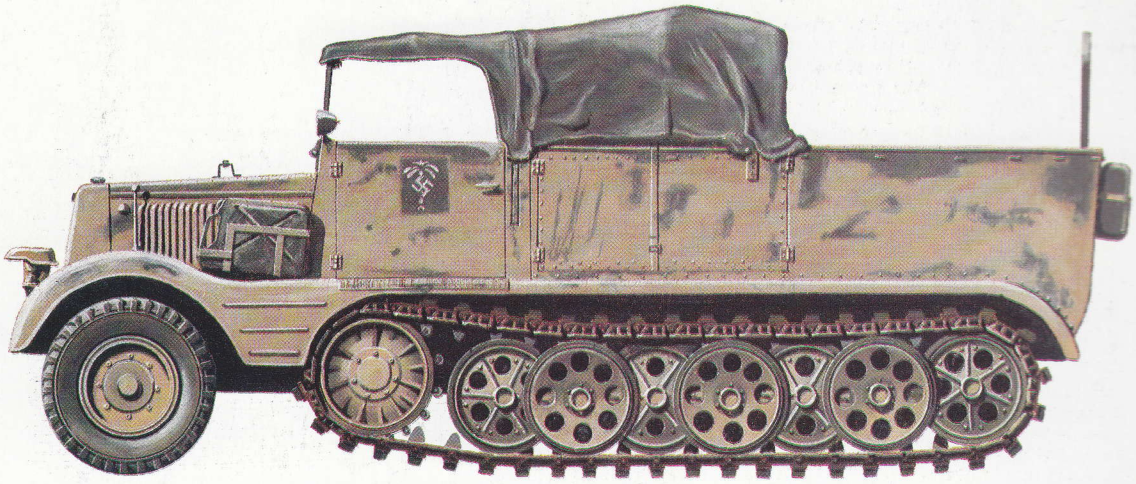
Two variants, the **SdKfz 11/2** and **SdKfz 11/3**, were produced specifically for the chemical warfare decontamination role. These two vehicles could carry more equipment and decontaminants than the smaller SdkKfz 10 equivalents, and were intended for use with larger equipments such as tanks; but as with the smaller vehicles few appear to have been produced and no records have survived of any being encountered. No doubt they were converted to become normal tractors.

At one point several production centres were busy churning out SdKfz 11s and it was one halftrack that remained in production until the end although by then only one factory, Auto-Union at Chemnitz, was in full spate. The Borgward plant at Bremen was supposed to remain in production, but was damaged by bomber raids and could turn out components only. By then some changes had been made to simplify manufacture. The metal superstructures of the early models was replaced by wooden units, and to increase the operational radius of the new vehicles increased fuel capacity was introduced (the normal tankage being 110 litres/24.2 Imp gal). The need for these tractor vehicles by 1945 was such that many were in use towing far heavier artillery pieces (and other loads) than those for which they were intended, one example of which was the large 8.8-cm (3.46-in) Pak 43 and Pak 43/41 anti-tank guns.



An SdKfz 11 leichter Zugkraftwagen 3t of the Afrika Korps tows a 10.5-cm (4.13-in) leFH 18 field howitzer soon after the arrival of the Korps in North Africa in 1941 – hence the pith helmets (soon discarded). This tractor was developed by Hanomag and remained in production until 1944.

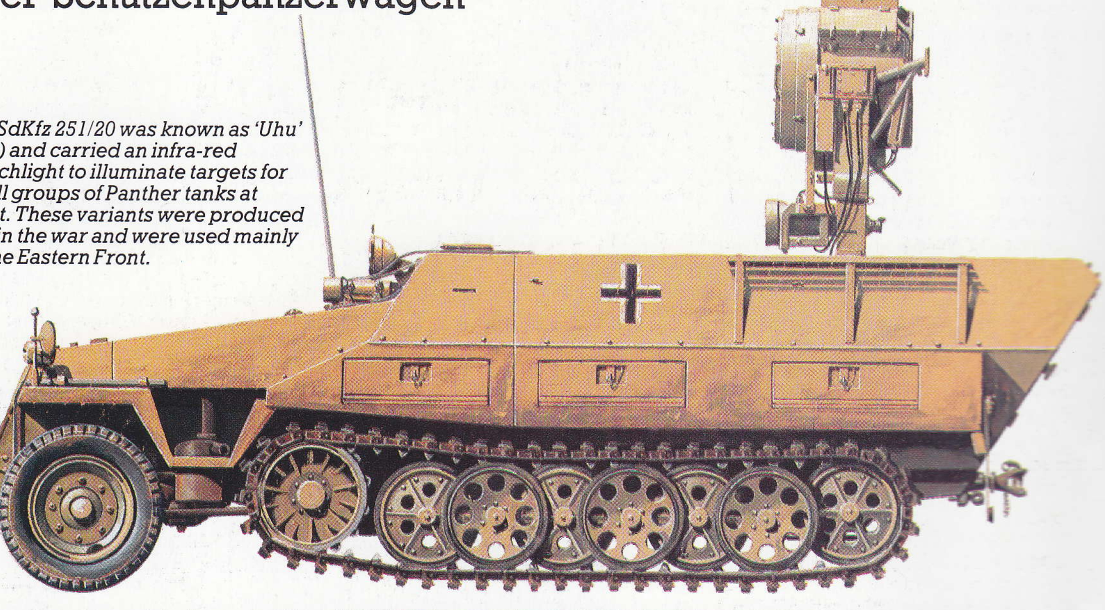
Specification
SdKfz 11
Crew: 9
Weight: 7100 kg (15,653 lb)
Powerplant: one Maybach NL 38 6-cylinder petrol developing 74.6 kW (100 hp)
Dimensions: length 5.48 m (17 ft 11.7 in); width 1.82 m (5 ft 11.7 in); height 1.62 m (5 ft 3.8 in)
Performance: maximum road speed 53 km/h (33 mph); range 122 km (76 miles)
Armament: see text



The SdKfz 11 leichter Zugkraftwagen 3t was primarily used as a tractor for medium field artillery such as the 10.5-cm (4.13-in) howitzer and 7.5-cm (2.95-in) Pak 40 anti-tank gun. The SdKfz 11 was so successful that it largely superseded the bigger SdKfz 6.

GERMANY

SdKfz 251 mittlerer Schützenpanzerwagen



The SdKfz 251/20 was known as 'Uhu' (owl) and carried an infra-red searchlight to illuminate targets for small groups of Panther tanks at night. These variants were produced late in the war and were used mainly on the Eastern Front.

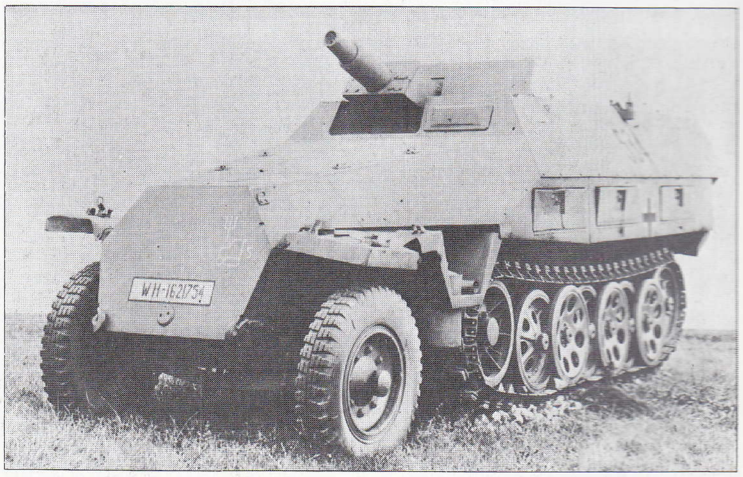
The **SdKfz 251 mittlerer Schützenpanzerwagen** series of halftracks had its origins in the same staff requirement as the SdKfz 250, but whereas the SdKfz 250 was a light 1-tonne vehicle the SdKfz 251 was classed as a medium (*mittlerer*) 3-tonne vehicle. The SdKfz 251 was a product of the Hanomag concern, based at Hanover, but the hull and superstructure were produced by Büssing-NAG. The basis of the SdKfz 251 was the **SdKfz 11 leichter Zugkraftwagen** 3-tonne artillery tractor halftrack, and the first production examples were issued to the 1st Panzer Division early in 1939.

The SdKfz 251 was primarily an armoured personnel carrier capable of carrying up to 12 men (a complete infantry section), and it was this **SdKfz 251/1** version that was produced in the greatest numbers. Armed with at least two machine-guns plus the carried crew weapons, the SdKfz 251/1 was a very useful fighting platform capable of keeping up with the fast-moving Panzer formations. No fewer than four differing hull versions were introduced, mainly as a result of the need to churn out more and more vehicles to meet the ever-expanding demand of front-line troops, but that was nothing compared to the number of variants produced for other roles. Armour varied in thickness from 6 to 14.5 mm (0.24 to 0.57 in).

There were no fewer than 22 of these special-purpose variants, plus the usual local and unofficial modifications. They ranged from weapon carriers of all kinds to ambulances, and in between came observation vehicles for various forms of artillery, command and communications versions (both radio and telephone), versions carrying infra-red searchlights or anti-aircraft weapons and even tank-killers mounting long 7.5-cm (2.95-in) anti-tank guns. The full listing is given elsewhere in this study, but perhaps the most powerful of the weapon carriers was a version of the basic SdKfz 251/1 known as the *'Stuka zum Fuss'* (dive-bomber on foot, or infantry Stuka). This was the personnel carrier with a tubular steel frame over the hull that carried three rocket-launcher frames on each side of the vehicle; 28-cm (11-in) or 32-cm (12.6-in) rockets were mounted on these side frames while still in their carrying crates and fired at short ranges against fixed or area targets. They were powerful weapons, especially for street fighting, but other SdKfz 251 versions, such as the **SdKfz 251/9** armed with a short 7.5-cm tank gun, were far more accurate. There was even a flamethrower version (the **SdKfz 251/16**) and one model was a late-war low-level anti-aircraft defence expedient, the **SdKfz 251/21** mounting three 1.5-cm or 2-cm aircraft guns (the MG151) on a single mounting.

The SdKfz 251 in all its forms was produced in thousands and became a virtual 'trademark' of the Panzer formations. It was used on all fronts, usually in close co-operation with tanks, and although the early versions displayed some unfortunate reliability problems the type settled down to become a rugged and dependable vehicle in whatever role it was used.

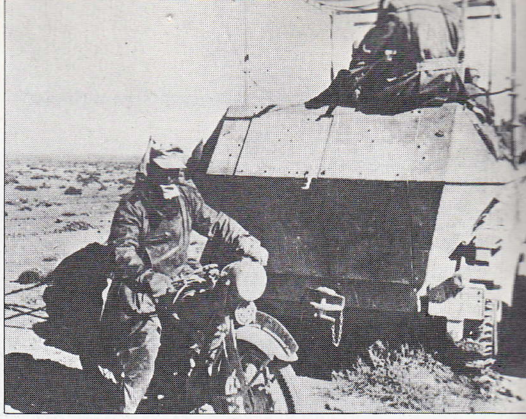
Specification
SdKfz 251
Crew: 12
Weight: 7810 kg (17,218 lb)
Powerplant: one Maybach HL 42 6-cylinder petrol engine developing 74.6 kW (100 hp)
Dimensions: length 5.80 m (19 ft 0.3 in); width 2.10 m (6 ft 10.7 in); height 1.75 m (5 ft 8.9 in)
Performance: maximum road speed 52.5 km/h (32.5 mph); road range 300 km (186 miles); gradient 24°; fording 0.6 m (24 in); 2.0 m (6 ft 6.7 in)
Armament: see text



The badge on the front of this SdKfz 251/9 denotes that it is part of the schwere Kanonenzug of the reconnaissance battalion of the 2nd Panzer Division. This is an early example of the mounting for the 7.5-cm (2.95-in) short assault gun used to provide local fire support; this vehicle is one of six in the company.

Panzergrenadier Halftracks in Action

Popularly viewed as the archetypal German halftrack, the SdKfz 251 served in many different roles in a wide variety of units in every campaign of the Wehrmacht. Over 20 discrete versions were manufactured, but it is best remembered as an armoured personnel carrier, the chosen vehicle of the mounted infantry at the spearhead of the Panzer divisions.



The SdKfz 251 was used in several versions as a communications or command vehicle carrying various radio 'fits'. Most of these vehicles were the SdKfz 251/3, seen here with a large frame radio aerial, although not all SdKfz 251/3s used this type of frame. This example is in use in North Africa.

Contrary to what Hollywood and the world of fiction would have us believe, the SdKfz 251 was not used by every unit of the German army. Despite the efforts of German industry there were never enough SdKfz 251s to equip anything other than a proportion of the mechanized infantry units attached to the Panzer divisions, and even there not every unit was equipped with halftracks.

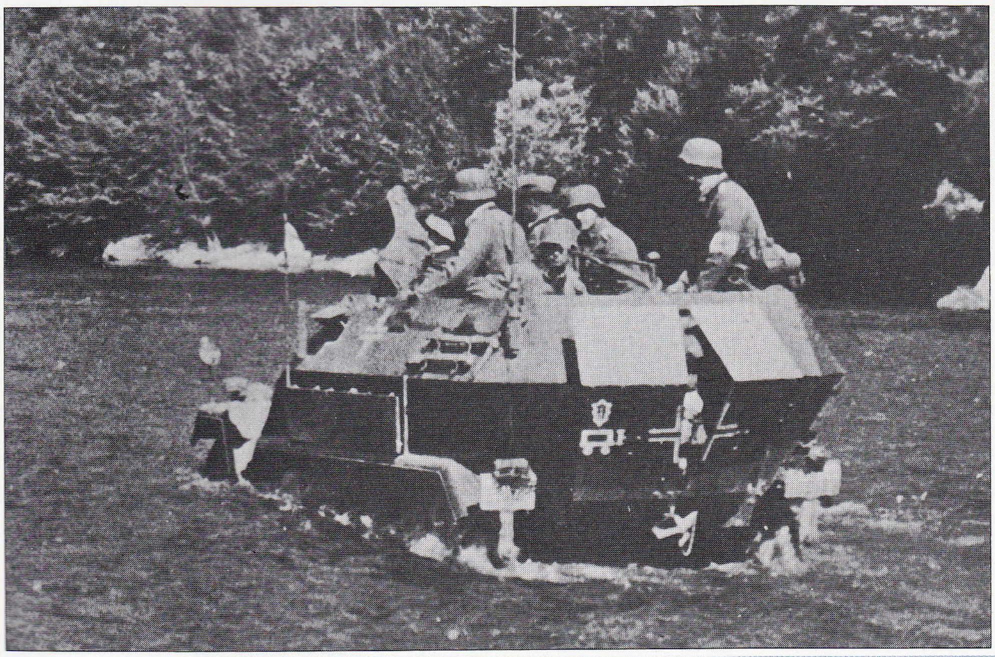
The primary operators of the armoured personnel carrier versions of the SdKfz 251 (i.e. the SdKfz 251/1) were the Panzergrenadiers. The basic unit of these troops was the *Abteilung* or battalion. There were two of these to a Panzergrenadier regiment, but in many cases one of these battalions was not equipped with halftracks and had instead to use trucks, though there were usually a few SdKfz 251s even in these non-armoured battalions. The fully-equipped *Panzergrenadierabteilung* was known as *gepanzerte* (Gp, or armoured) and had a headquarters company, three Panzergrenadier companies and a weapon support company. There was also a logistics company for the supply of fuel, food and ammunition.

Each company had its own small headquarters, three SdKfz 251 platoons, a platoon from the weapon support company, and an integral anti-aircraft platoon armed with towed 20-mm anti-aircraft cannon. On paper each platoon had a strength of 30 officers and men travelling on four SdKfz 251s, while the headquarters and support units used motorcycles as well. Each platoon could from time to time have extra personnel such as combat engineers or signallers working with it, and the weapon support strength could vary according to mission. Usually each company had on call four heavy machine-guns, two 81-mm (3.19-in) mortars (usually carried in SdKfz 251/2s), and two short 7.5-cm (2.95-in) guns. The latter could be carried on SdKfz 251/9s, but were more often towed leIG 18s towed behind SdKfz 250s or perhaps trucks. On paper the Panzergrenadier company had a strength of four officers, 32 NCOs and 147 men.

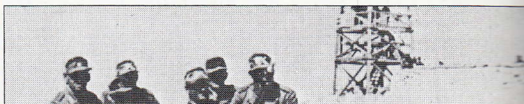
Of course all of these figures were for planning purposes only. In practice the number of men and vehicles varied considerably. In some elite formations and in many of the Waffen-SS formations these totals were frequently exceeded, but in most of the army Panzergrenadier units they were not even approached. Throughout the war the German army suffered from so chronic a shortage of equipment and trained soldiers that many SdKfz 251s went into action with their logistic requirements met not by modern German trucks but by captured French or Soviet vehicles of the most diverse kinds, and although the SdKfz 251 was supposed to carry 12 men many carried far less than that at times.

Although the SdKfz 251 could carry 12 men, it could do so only at a squeeze and with a full load there was little room for anyone to do anything but sit down. In combat only about eight men could be comfortably carried in addition to the driver, who sat forward behind his steering wheel that was angled with the top towards him to save space. Just behind the driver was the forward machine-gun which could be either a 7.92-mm (0.312-in) MG34 or later a 7.92-mm MG42. Originally this machine-gun was mounted on an open pintle, but combat experience dictated that later versions used a sloping shield to protect the gunner. Another machine-gun was mounted over the hull rear on a swinging gantry. On some section leaders' vehicles the forward gun was replaced by a 3.7-cm (1.456-in) Pak 35/36 anti-tank gun (as on the SdKfz 251/10) but after 1941 this no longer had much utility as an anti-armour weapon and was used instead against strongpoints or against soft-skinned targets.

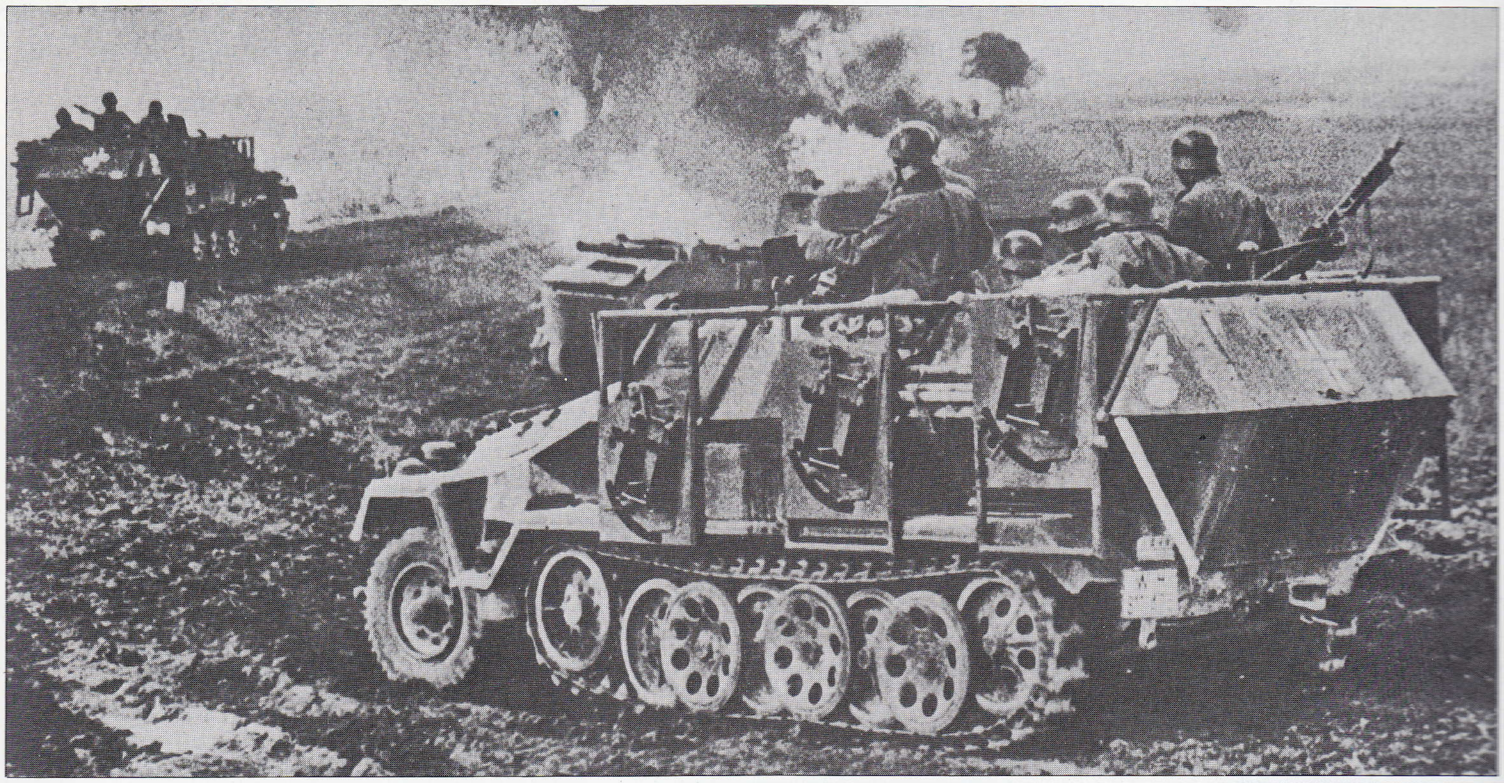
In theory the soldiers carried on the SdKfz 251 were supposed to be equipped with sub-machine guns such as the 9-mm (0.354-in) MP38 or MP40, especially as the latter had been designed and produced with Panzergrenadiers in mind. In fact the supply situation usually meant that these short weapons were issued to NCOs only at the rate of one per vehicle, and the rest of the troops used standard rifles or carbines. To increase their shock effect, many of the soldiers carried extra grenades and the vehicle machine-guns were frequently dismounted when the troops left the vehicle for operations on foot, though at least one machine-gun was generally left on the vehicle for fire support or to defend the vehicle against surprise attack.



An SdKfz 251 fords a river, apparently during an exercise, for the armament is stowed and the rear doors open. The vehicle is an early model with the side vision ports that were later eliminated to ease production. Note the useful side boxes often used to stow the crew's personal kit.



Above: An SdKfz 251/1 personnel carrier moves past an old North African fort soon after the Afrika Korps arrived in Libya. The flag across the bonnet is for recognition purposes by aircraft, and a typical Afrika Korps touch is the recovery cable coiled at the front ready for immediate use if required.

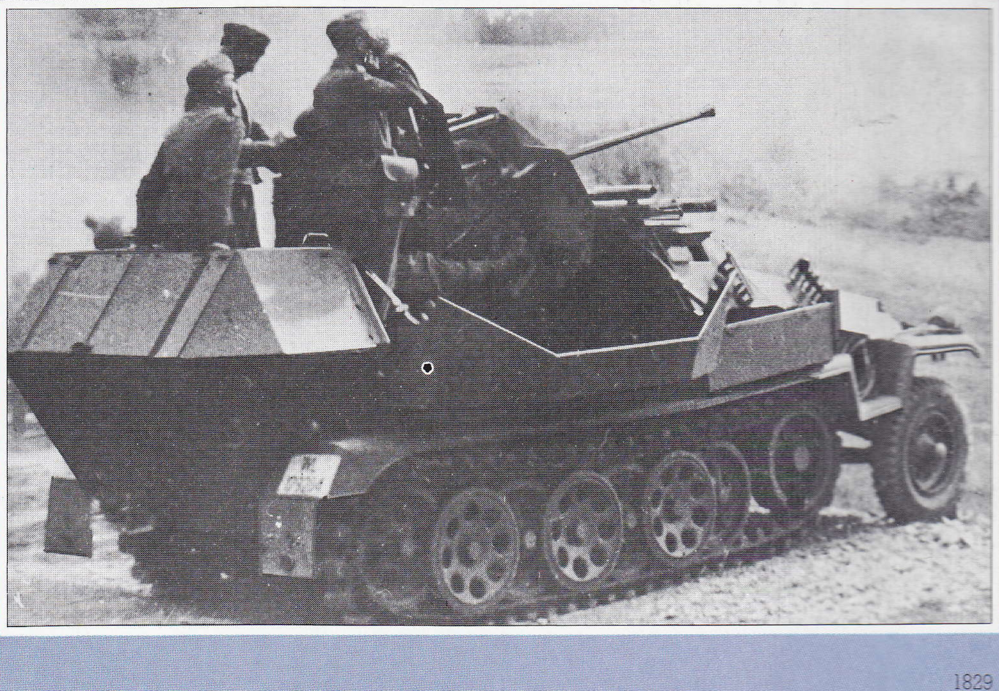


The SdKfz 251/1 personnel carrier could be fitted with rocket launcher frames known as Wurfrahmen *to launch 28-cm or 32-cm (11-in or 12.6-in) rockets. These vehicles were known as the 'Stuka zum Fuss', and were used to demolish strongpoints and large structures. The rockets carried HE or incendiary warheads.*

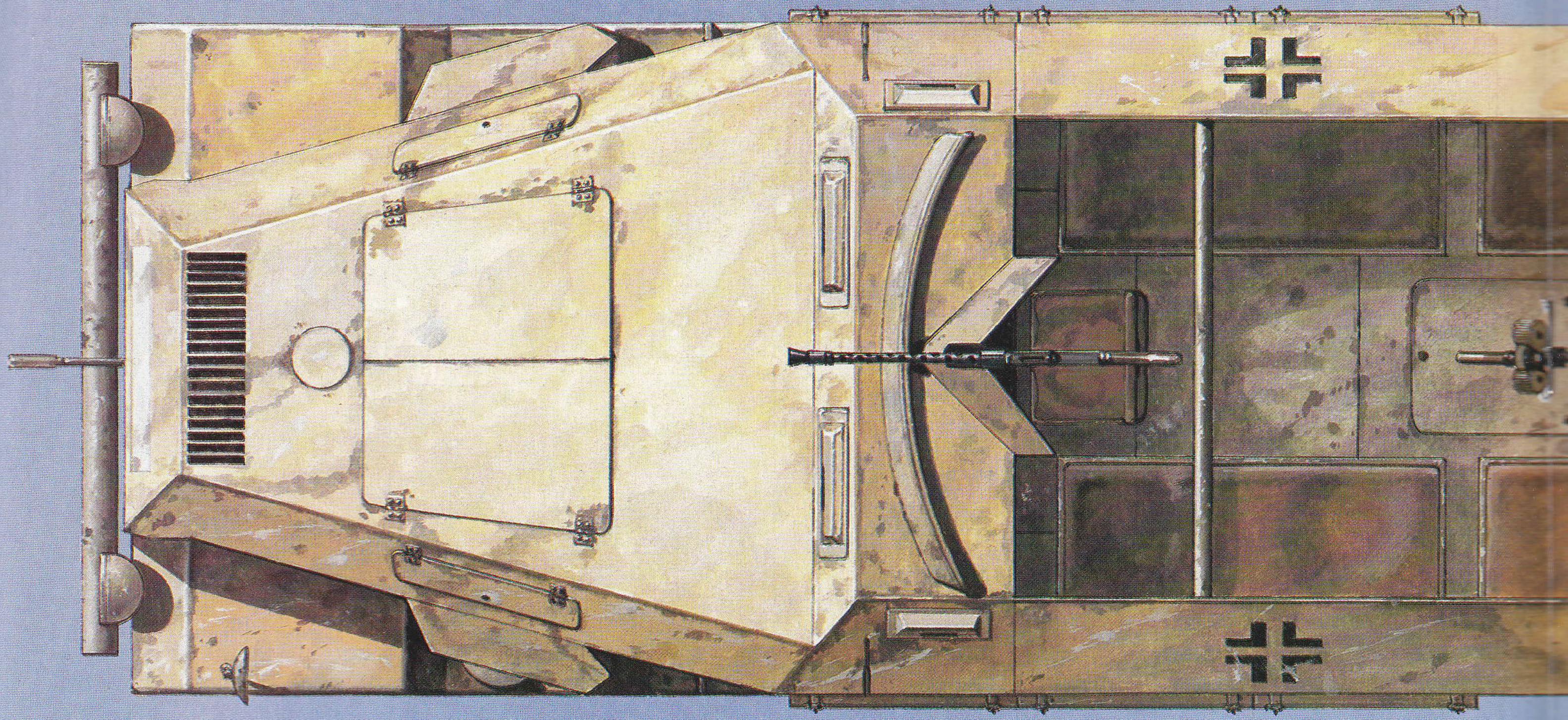
The SdKfz companies usually operated in close co-operation with tanks. As the tanks moved forward it was the job of the Panzergrenadiers to scout ahead, keep away enemy tank-killer squads, watch out for obstacles or minefields and generally make things easier for the nearly-blind tank crews. Anti-tank gun positions were always a Panzergrenadier objective, and any such weapons were either attacked directly or had fire directed at them from the heavy vehicle or support weapons. But not all Panzergrenadiers moved in direct contact with the tanks. Very often the SdKfz 251 units had to move on the flanks of an armoured advance, especially in the period from 1939 to 1942 when the Panzer 'Blitzkrieg' tactics were at their most effective. During the Blitzkrieg the tanks usually moved rapidly through the enemy positions and then advanced far to the rear through the enemy rear areas, usually leaving their supporting arms far behind them and leaving their flanks wide open to enemy countermoves. It was the role of the Panzergrenadiers to move forward to guard these open flanks against counterattack. At times this meant the Panzergrenadiers abandoning their highly mobile role to dig defended positions until reinforcements could be brought up to take over their task. Then it was back into the vehicles and forward once more to shield the ever-open flanks left by the advancing tanks.

New tactics

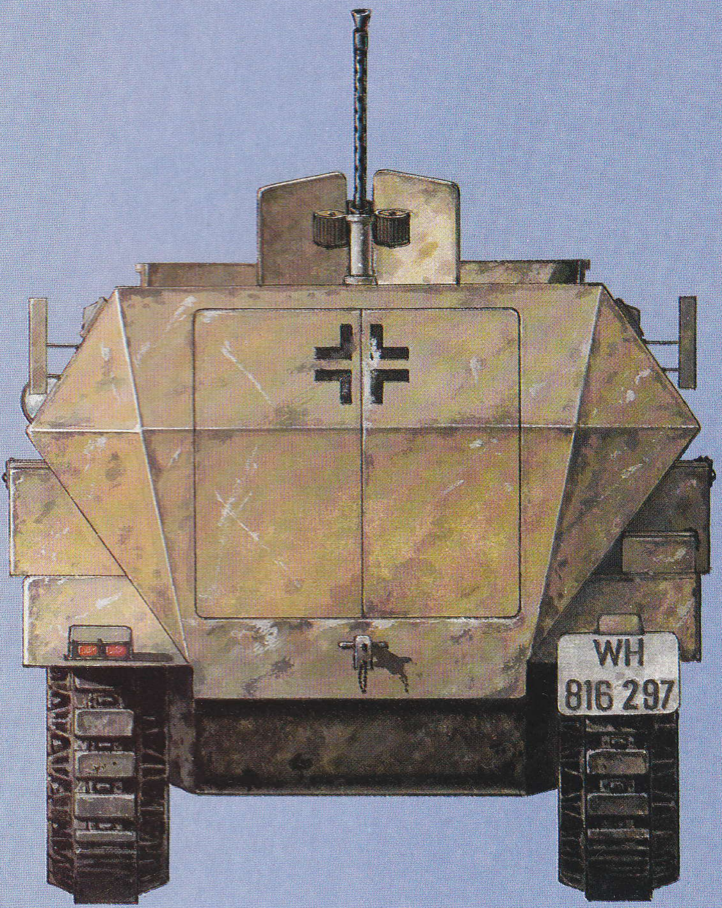
Once the Blitzkrieg was stymied by heavily defended localities, as it was from about 1942 onwards, the Panzergrenadiers lost this flank support role to a large extent and instead switched rapidly to a new set of tactics in which the roles of the tank and the mechanized infantry were reversed: instead of Panzergrenadiers supporting the tanks, the tanks tended to support the attacking infantry and the SdKfz 251's armour was used to protect the vehicle's occupants as they moved across a battlefield towards their objective. Once on the objective the Panzergrenadiers debussed to fight with local support provided by the SdKfz 251's machine-guns and any other weapons carried by other vehicles. After 1942 it was these dashing infantry tactics rather than the use of tanks that usually gained ground, for after 1942 the rapid growth in power and numbers of Allied anti-tank weapons meant that the tank was not always as powerful as had earlier been the case. Only when the infantry had gained ground and neutralized the anti-tank weapons could the tanks move forward in the numbers required to make an armoured breakthrough to the rear areas. The Panzergrenadiers usually moved forward under artillery support supplied by the towed and self-propelled artillery pieces that moved with the SdKfz 251, though all too often it was discovered that heavier and heavier support weapons were required. This gave rise to the growth in number of heavy



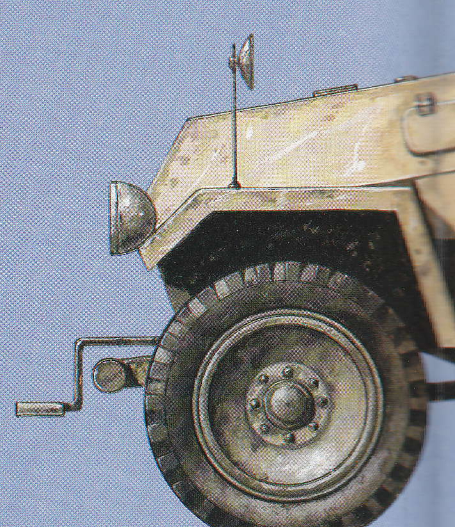
The SdKfz 251 version armed with the 2-cm (0.79-in) Flak 38 never did get its own designation, for only a few were produced from 1942 onwards. This version had sides that folded down to provide more room for the gun and crew in action. The crew was four to six, and most were used only on the Eastern Front.

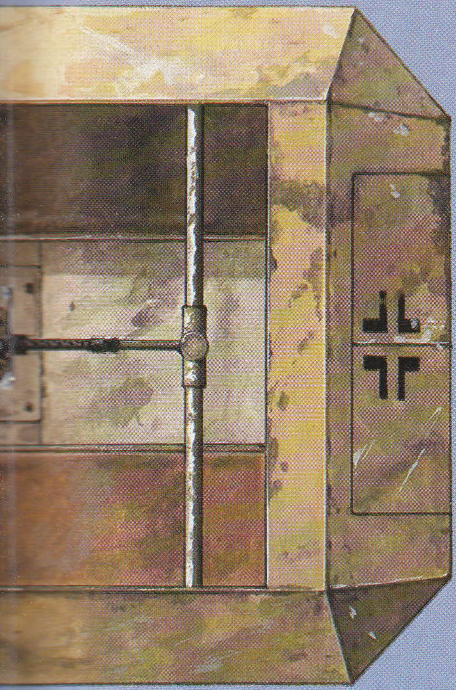


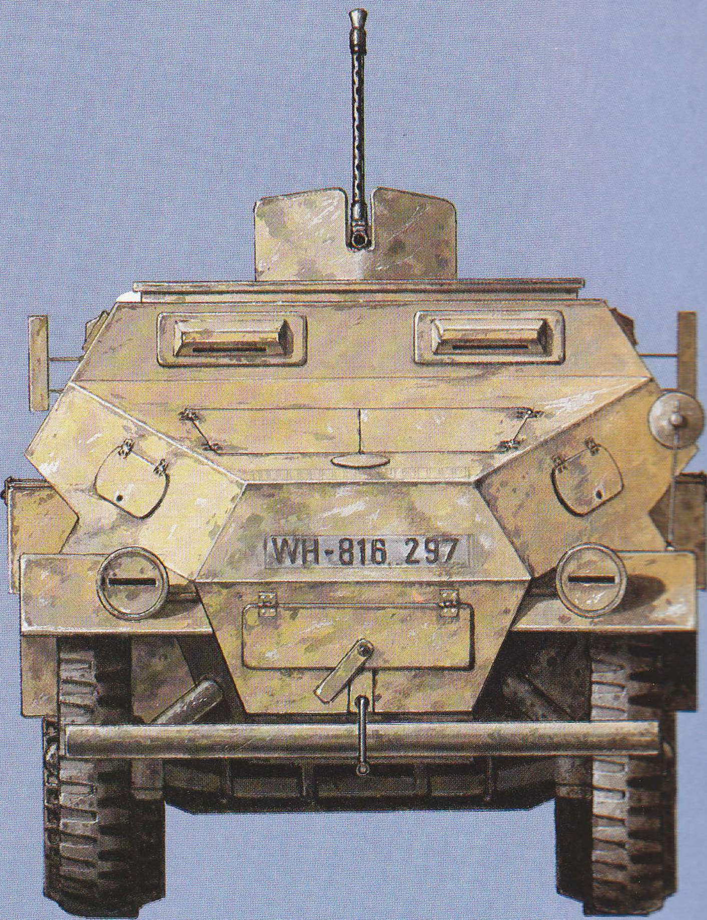
SdKfz 251



The SdKfz 251 series was developed as an offshoot of the German half-tracked artillery tractor series to provide an armoured personnel carrier for infantry accompanying the newly-formed Panzer divisions. This is one of the more numerous variants, the SdKfz 251/1, that could carry up to 12 soldiers and was armed with two MG34 machine-guns. Various production changes were made to this vehicle throughout its life, which lasted from early 1939 until the end of the war in 1945. It was the main equipment of the motorized infantry regiments throughout the war and was used on all fronts.



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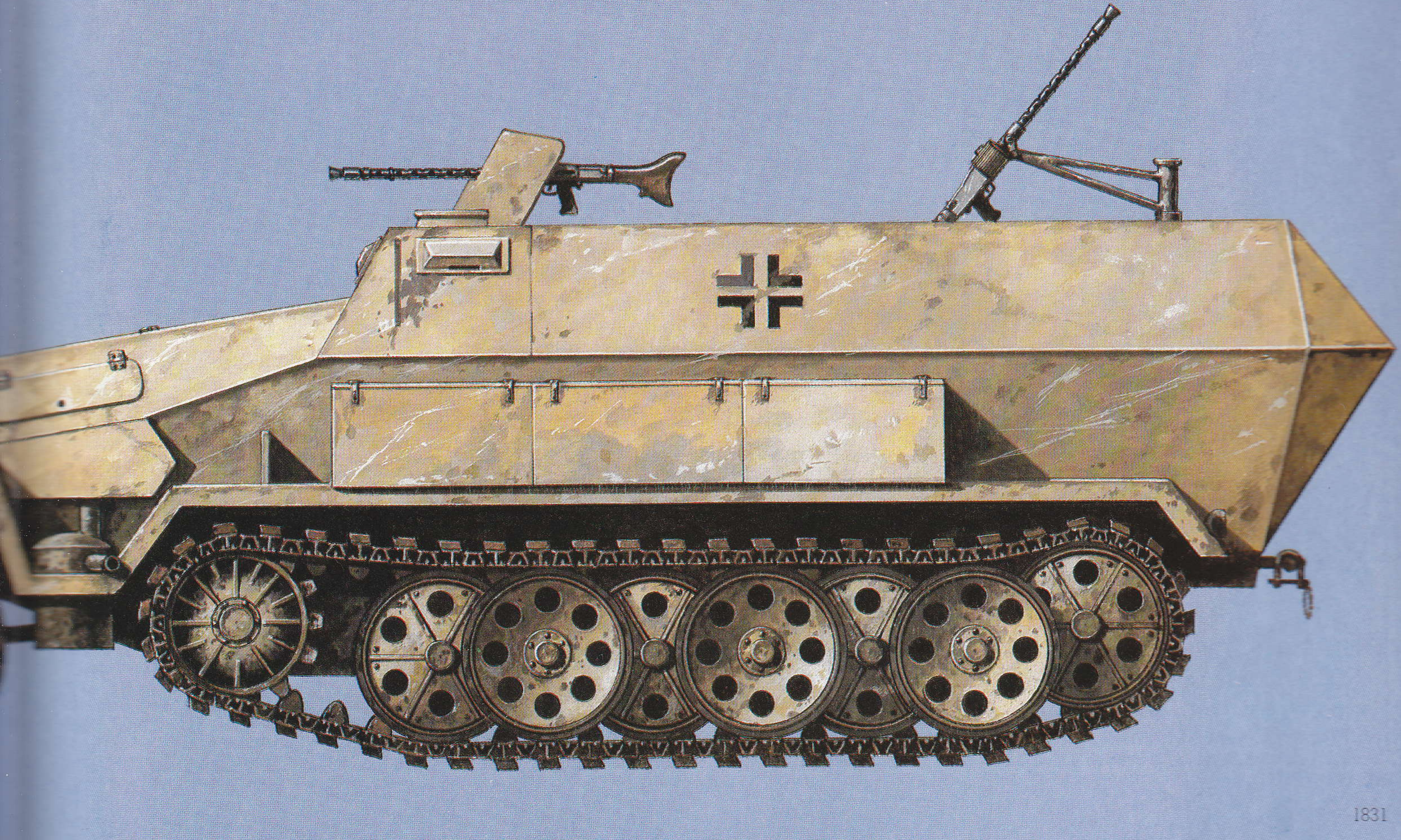
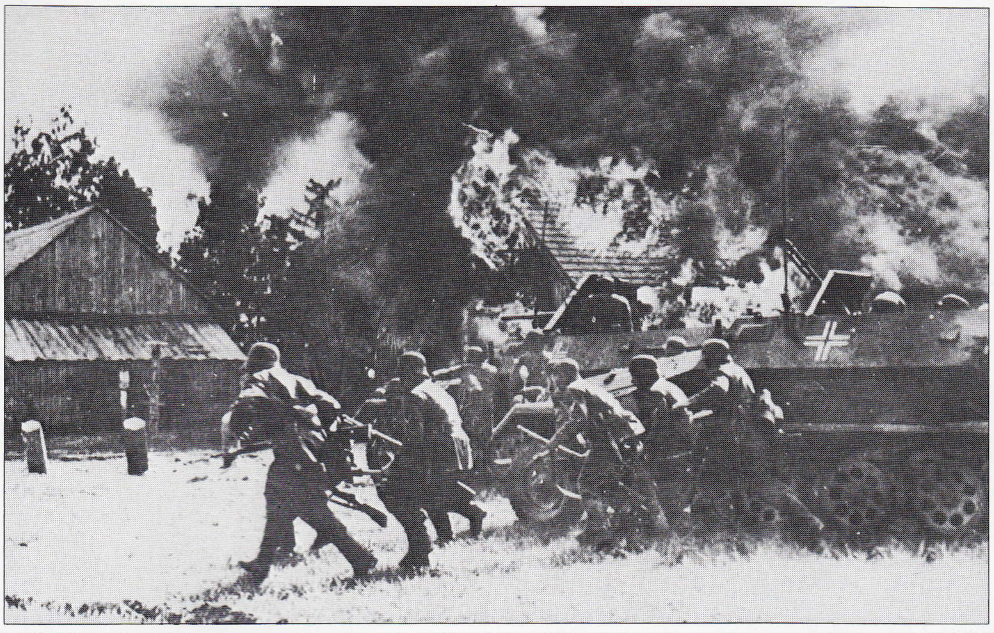


Panzergrenadier Halftracks in Action



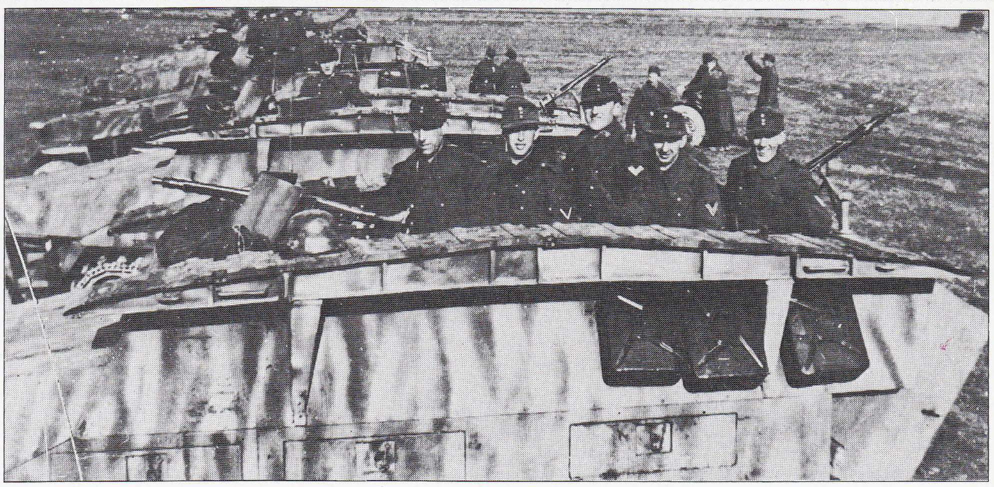
A typical Soviet scene in the summer of 1941, with German infantry storming a small village under the fire cover of an SdKfz 251/10 (rear), carrying a 3.7-cm (1.456-in) Pak 35/36 anti-tank gun. The nearest SdKfz 251/1 is armed with a 7.92-mm (0.312-in) MG 34 and the troops have dismounted from these vehicles.

weapons carried by the SdKfz variants. Some units did not wait for the 'official' designs to reach them. Instead SdKfz 251s were sent back to field workshops to have weapons such as 2-cm Flak 39 anti-aircraft cannon fitted to the forward machine-gun position to provide more firepower in the final support phases of an attack. Captured Soviet anti-tank rifles were frequently mounted unofficially for the same purpose and by the time the war ended triple mountings of 15-mm or 20-mm aircraft machine-guns intended for anti-aircraft use (the SdKfz 251/21) were frequently used instead in the ground-support role.

Thus by 1945 the Panzergrenadiers were fighting with a set of tactics very different from those they had been using in 1939, and they were doing so under a form of warfare where the art of defence was more in use than the attack. As the Allied armies moved closer to the heartland of the Reich the Panzergrenadiers frequently found themselves in the role of mobile stopgaps in attempts to stem the ever-advancing forces of the Allies; this was especially true on the Eastern Front. There the open terrain and the sheer size of the battlefields meant that in-line defence was impossible and small mobile teams were moved from location to location either to counter-attack or at best to stem the forward-moving Red Army hordes. These teams established themselves as a formal method of waging war that is now in use everywhere, but which was at the time novel. Instead of operating along the battalion/company/platoon basis within established balances of supporting arms, the tanks and Panzergrenadiers instead established the concept of the battle group and the combat team. These formations were of no fixed establishment or size and were formed according to the dictates of the tactical situation. Various groupings of Panzergrenadiers, tanks and supporting artillery could be thrown together to carry out what were frequently defensive missions, and were just as quickly disbanded and re-formed to carry out some other operational task. This required what was for the time a radical change in hierarchical thought, although the German *Sturmtruppen* had used similar tactics during the latter stages of World War I. In these rapidly-changing situations the SdKfz 251 and its load of Panzergrenadiers were always at a premium, and if there had been more of them the course of the closing stages of the war in Eastern Europe might have changed, if only for a while.

But by 1945 the SdKfz 251s were being used in a long series of defensive moves and the nature of the SdKfz itself had changed. The need to produce more and more SdKfz 251s led to production changes to speed up the manufacturing process, and the later SdKfz 251s looked very different from their 1939 counterparts. The last 'official' SdKfz 251 variant, the SdKfz 251/22, showed how defensive its role had become: this version was overloaded with the weight of a 7.5-cm Pak 40 anti-tank gun, its heavy ammunition and a crew of four men, and was supposed to act not as a support weapon but as a mobile tank-killer. It was late 1944 when the first of these *Panzerjäger* vehicles appeared, and the few that were produced acquitted themselves well enough despite the fact that the bulk and weight of their armament severely limited their mobility.

There were two versions of the SdKfz 251 produced for use by combat engineers: the SdKfz 251/5 (small numbers only) and the SdKfz 251/7, seen here. They carried short assault bridges on side racks, one either side, and the interior was used to carry other specialist combat engineer equipment such as explosives.



SdKfz 251 variants

Model	Role
SdKfz 251/1	personnel carrier (could be fitted with rocket frames)
SdKfz 251/2	mortar carrier
SdKfz 251/3	radio vehicle
SdKfz 251/4	artillery tractor/ammunition carrier
SdKfz 251/5	engineer vehicle
SdKfz 251/6	commander's vehicle
SdKfz 251/7	engineer vehicle
SdKfz 251/8	ambulance
SdKfz 251/9	75-mm gun carrier
SdKfz 251/10	37-mm anti-tank gun carrier
SdKfz 251/11	telephone vehicle
SdKfz 251/12	artillery ranging and survey vehicle
SdKfz 251/13	artillery sound-ranging vehicle
SdKfz 251/14	artillery sound-ranging vehicle
SdKfz 251/15	artillery flash-spotting vehicle
SdKfz 251/16	flamethrower vehicle
SdKfz 251/17	20-mm anti-aircraft gun carrier
SdKfz 251/18	artillery observation vehicle
SdKfz 251/19	armoured telephone exchange
SdKfz 251/20	infra-red searchlight carrier
SdKfz 251/21	heavy machine-gun carrier
SdKfz 251/22	75-mm anti-tank gun carrier

GERMANY

SdKfz 6 mittlerer Zugkraftwagen 5t

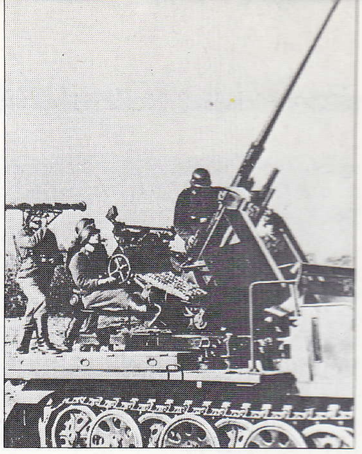
The SdKfz numbers allotted to the artillery halftracks used by the new German army during the early 1930s did not follow a logical sequence, and the **SdKfz 6 mittlerer Zugkraftwagen 5t** was a medium tractor. Development of this vehicle commenced during 1934, the early work being carried out by Büssing-NAG in Berlin. There were two main purposes: one was for the SdKfz 6 to act as the main tractor vehicle for the 10.5-cm (4.13-in) leFH 18 batteries, and the other was for the engineer units, where the tractor would be able to tow the heavy combat engineer equipment on trailers. In both cases the vehicle could carry up to 11 men, and more at a squeeze.

Production of the SdKfz 6 vehicles was carried out by Büssing-NAG and Daimler-Benz, but the numbers involved came to no more than about 737. The main reason for this was that the SdKfz 6 was rather an interim vehicle that fell between two stools: lighter vehicles could be used to tow the artillery pieces, and it was really too light for some of the heavier engineer equipment. It was also rather costly to produce, so by 1941 a decision was made to phase the vehicle from production and replace it with the far less expensive sWS. Even so, it was late 1942 before production finally finished and the vehicles already produced continued in use right until the war ended, sometimes pulling artillery pieces far heavier than those for which the type had been designed.

Two versions of engine were produced for the SdKfz 6, the first developing 67.1 kW (90 hp) and the later version 74.6 kW (100 hp). Surprisingly enough, the SdKfz 6 was modified only slightly during its service career. Most were produced as standard tractors with seating for the artillery detachment that could be covered by a canvas tilt, but there were also three weapon-carrier variants. The first was the **7.5-cm Slf L/40.8** and never really got past the prototype stage; it was an attempt to produce a mobile 7.5-cm (2.95-in) gun for use with cavalry units, and at least three prototypes were produced between 1934 and 1935. The type was never placed in production, but at least one was captured during the fighting in North Africa. Then there was the model known as the **'Diana'** or **7.62-cm Pak 36(r) auf Panzerjäger Slf Zugkraftwagen 5t**, an attempt to mount captured Soviet 76.2-mm (3-in) guns in a high armoured superstructure built onto the rear of an SdKfz 6. This superstructure was open and rather high and the gun was placed on the vehicle complete with its wheels and attenuated trails. The gun was the Soviet Model 1936 which was used as a dual anti-tank/field gun. Only nine were produced and again one was captured in North Africa by the Allies. The third SdKfz 6 weapon carrier was the **SdKfz 6/2**, which mounted a 3.7-cm (1.456-in) Flak 36 anti-aircraft gun on an open platform behind the driver's position; the sides folded down to act as a working platform for the gun crew. The first of these variants was produced during 1937 and most of them went to the Luftwaffe. They had a crew of seven and were widely used.

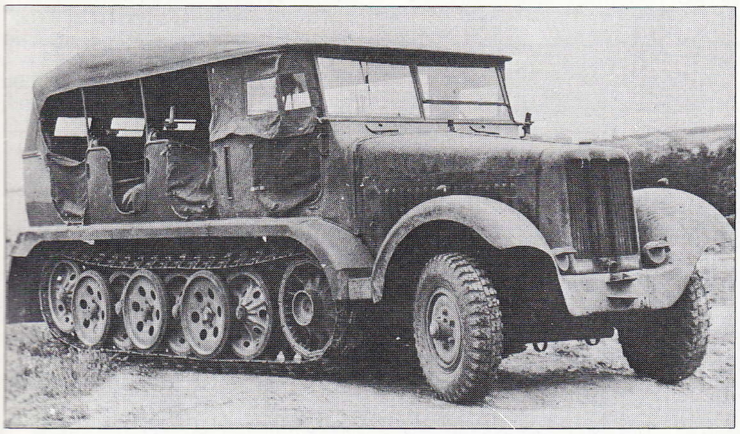
Specification

SdKfz 6
Crew: 11
Weights: 8700 kg (19,180 lb)
Powerplant: one Maybach NL 38 6-cylinder petrol engine developing 67.1 kW (90 hp)

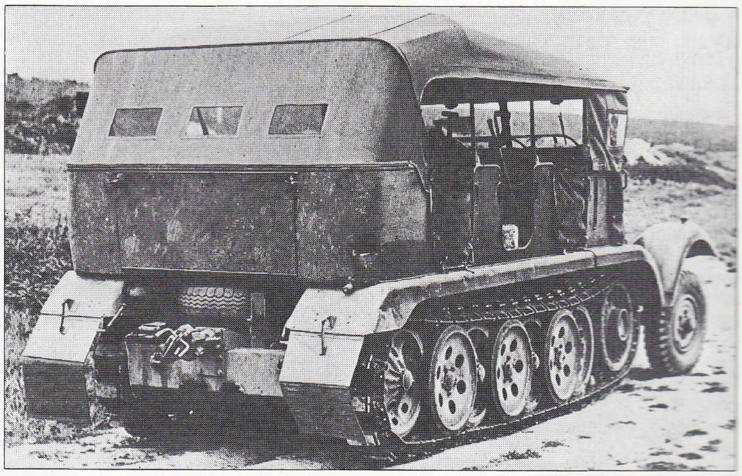


First produced in 1937, the SdKfz 6 AA variant mounted a 3.7-cm (1.456-in) Flak 36 on an open platform. The presence of a crew member with rangefinder dates the picture as early in the war; later they were withdrawn to save manpower.

Dimensions: length 6.01 m (19 ft 8.6 in); width 2.20 m (7 ft 2.6 in); height 2.48 m (8 ft 1.6 in)
Performance: maximum road speed 50 km/h (31 mph)
Armament: see text



The Czech-built Praga SdKfz 6s featured longer track bogies than the Bussing-NAG models, and had different wings. They were powered by a Maybach HL54 TUKRM six-cylinder engine developing 86 kW (115 hp), giving a maximum road speed of 50 km/h (31 mph).



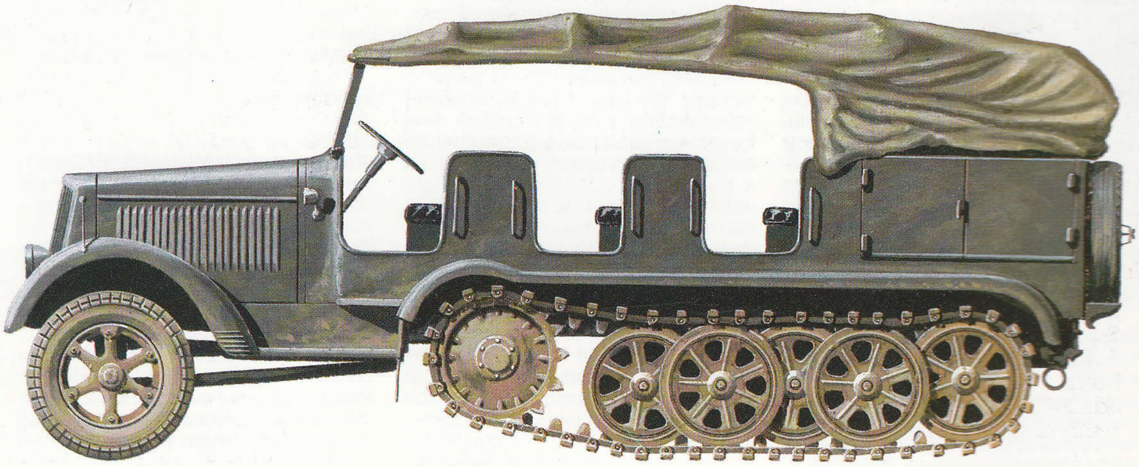
The SdKfz 6 was originally planned to tow the 10-5-cm (4.13-in) leFh 18 howitzer, but was phased out of production in 1942 as lighter tractors like the sWS were equally capable and the SdKfz 6 was too light for heavier loads. Three weapons-carrier versions were also produced.

GERMANY

SdKfz 7 mittlerer Zugkraftwagen 8t

The **SdKfz 7 mittlerer Zugkraftwagen 8t** had its origins in a series of Kraus-Maffei design projects that dated back as far as 1928, but it was not until an army staff requirement for an 8-tonne halftrack tractor was made in 1934 that development really got under way. Between 1934 and 1938 a number of trial versions were produced until the final version appeared in 1938 as the SdKfz 7 mittlerer Zugkraftwagen. This vehicle earned its primary fame as the main tractor for the well-known 8.8-cm (3.46-in) Flak 18, 36 and 37 guns, but it was also used as a tractor for many other artillery weapons including the 15-cm (5.9-in) sFH 18 and the 10.5-cm (4.13-in) K 18.

In its tractor form the SdKfz 7 could carry up to 12 men and their kit, and there was still space left for ammunition and/or other supplies. The gun detachment sat on open bench seats behind the driver, and could be covered by a canvas tilt to keep out some of the weather. The vehicle could tow



Famous as the main tractor for the 88-mm Flak 18, 36 and 37 guns, the SdKfz 7 also towed a wide variety of field artillery. Over 3,000 of these halftracks were in service by the end of 1942, and it was still in widespread use at the end of the war.

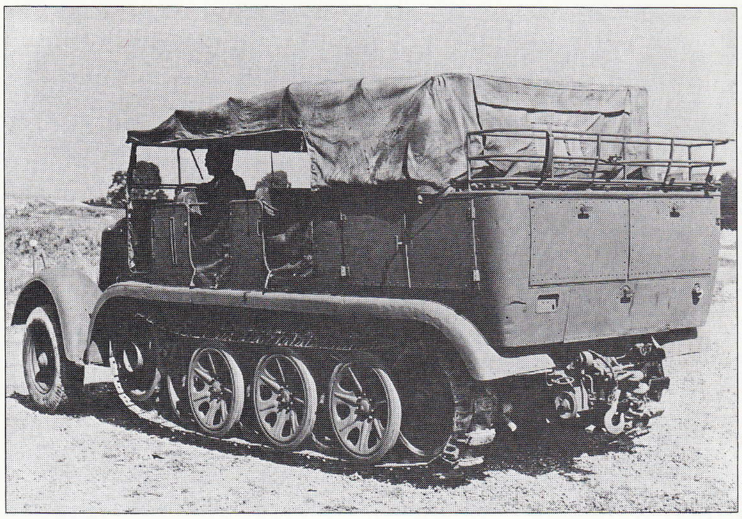
weights up to 8000 kg (17,637 lb), and most vehicles were fitted with a winch that could pull up to 3450 kg (7,606 lb). The SdKfz 7 proved to be a most useful vehicle and was widely admired. A captured example was copied in the United Kingdom by Bedford Motors with a view to manufacture for Allied use, and the Italian produced a near-copy known as the **Breda 61**. But the Germans carried on churning out as many as they could. By the end of 1942 there were 3,262 in service. Not all of these were tractors, for the load-carrying capacity of the SdKfz 7 was such that it also made an ideal weapon platform.

The first of these weapon carriers was the **SdKfz 7/1**, which mounted a 2-cm Flakvierling 38 four-gun anti-aircraft mounting on the open rear. On many of these vehicles the driver's position and the engine cover were provided with armoured protection. The SdKfz 7/1 was used extensively for the protection of columns in the field and the four cannon proved deadly to many Allied low-level fliers. This was not the only anti-aircraft version, for the **SdKfz 7/2** mounted a single 3.7-cm (1.456-in) Flak 36 anti-aircraft gun. An attempt was made to mount a 5-cm (1.97-in) Flak 41 on a SdKfz 7, but since neither the gun nor the conversion was very successful no further work was carried out once trials had been completed. Some SdKfz 7s were also converted to mount single-barrel 2-cm cannon for anti-aircraft use.

Perhaps the oddest use for the SdKfz 7 was when existing vehicles were converted to accommodate armoured superstructures for use as observation and command posts for V-2 rocket batteries during 1944. The V-2 rockets were prone to explode on their launch stands as they were being fired so the armour protected the launch crews. How many of these **Fuerleitpanzer auf Zugkraftwagen 8t** conversions were made is uncertain.

Production of the SdKfz 7 series ceased during 1944, but by then numbers had been built by Krauss-Maffei in Munich, the Sauserwerke in Vienna and the Borgward works at Bremen. In the post-war years many were appropriated for Allied use, and the Czech army used numbers for some years.

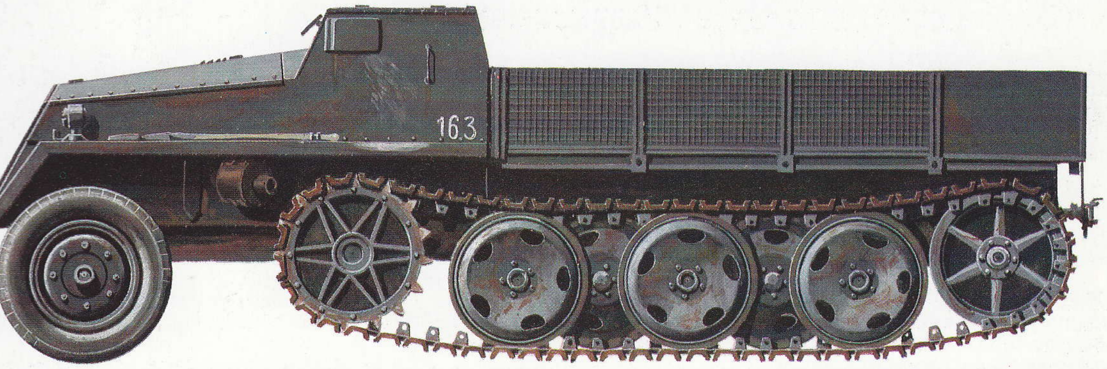
Specification
SdKfz 7
Crew: 12
Weights: 11550 kg (25,463 lb)
Powerplant: one Maybach HL 62 6-cylinder petrol engine developing 104.4 kW (140 hp)
Dimensions: length 6.85 m (20 ft 3 in); width 2.40 m (7 ft 10.5 in); height 2.62 m (8 ft 7.1 in)
Performance: maximum road speed 50 km/h (31 mph)
Armaments: see text



An SdKfz 7 mittlerer Zugkraftwagen 8t was captured in North Africa and was extensively tested back in the United Kingdom. It made such an impression that Bedford Motors built a direct copy, but this was not taken into British service. The Italians also built a copy known as the Breda 61.

GERMANY

schwerer Wehrmachtsschlepper



The schwerer Wehrmachtsschlepper was intended to be a low-cost general-purpose tractor to fulfil a number of roles. Production started during 1943 but always lagged behind demand, leading to the development of the Maultier. This version was fitted with an armoured cab as a forward supply vehicle.

By the end of 1941 experience in the field had demonstrated that the German halftrack fleet was in some need of revision. At the bottom end of the range the 1-tonne and 3-tonne cargo and supply/artillery tractors were well capable of carrying on as they were, but the medium to heavy range was proving more complex. It was decided that the 5-tonne range would be discontinued since the 8-tonne range would be required for heavy artillery and other purposes. Thus an interim between the 3-tonne and 8-tonne vehicles was sought, but it had to be a relatively low-cost solution for by 1941 the German war machine was being stretched, not in capacity alone but in the range of types of equipment required: a low cost halftrack was thus needed.

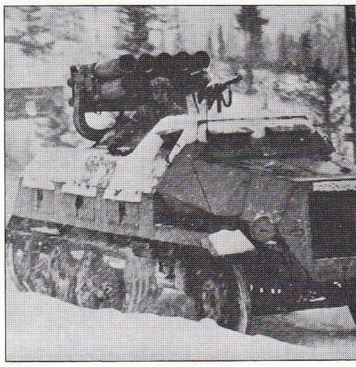
The design accepted was a Büssing-NAG offering, and eventually became known as the **schwerer Wehrmachtsschlepper** (sWS, or army heavy tractor). It was intended not so much for the Panzer or artillery formations but for infantry units, for which it would act as a general personnel carrier and supply vehicle. Accordingly it was virtually a half-tracked truck with virtually no armour in its cargo-carrying form and an open cab with a soft top for the driver and one passenger. In order to keep costs as low as possible the tracks did not use the time-consuming and expensive rubber capped tracks of front-line vehicles, but instead used single dry-pin all-steel tracks.

The sWS went into production at the Büssing-NAG plant in Berlin and also at the Ringhofer-Tatra plant in Czechoslovakia, but production was very slow. The sWS did not have a very high production priority and from time to time Bomber Command weighed in to disrupt things to an extent that in place of the expected 150 vehicles per month, from December 1943 (when production commenced) to September 1944 only 381 had been delivered. These serious shortcomings in production led to the hasty 'Maultier' improvisation, but sWS production limped on almost until the end of the war and some survived to serve the new Czech army for a number of years after the war.

The small numbers produced did not prevent the sWS from being subjected to the usual special-purpose variants. The basic truck model could be converted to act as a rudimentary front-line ambulance carrying stretchers under a canvas awning mounted on a frame. A special front-line supply version was fitted with an armoured cab and engine cover, and a similar arrangement was used for a projected version that would have carried a 3.7-cm Flak 43 anti-aircraft gun on a flatbed area at the rear; only a few of these **3.7-cm Flak 43 auf sWS** versions were produced. Another variant proposed but built in small numbers only was an armoured version with a hull over the rear. On the roof of this hull was placed a 10-barrel launcher for 15-cm (5.9-in) artillery rockets; 10 rockets were carried in the launcher tubes and more inside the hull. This **15-cm Panzerwerfer 42 (Zehuling) auf sWS** version was to have had a crew of five, but it is doubtful if many actually reached the service stage.

Although few were actually produced when compared to the totals of other German halftracks, the sWS proved efficient enough in service, and was proportionately far more cost-effective than some other models.

Specification
sWS
Crew: 2
Weights: about 13500 kg (29,762 lb)
Powerplant: one Maybach HL 42 6-cylinder petrol engine developing 74.6 kW (100 hp)
Dimensions: length 6.68 m (21 ft 11 in); width 2.50 m (8 ft 2.4 in); height 2.83 m (9 ft 3.4 in)
Performance: maximum road speed 27 km/h (16.8 mph)
Armament: none



During 1944 a number of Maultier trucks were fitted with armoured bodies onto which the 10-barrelled Panzerwerfer 42 was placed. Some 300 of these conversions were made, and were used to provide rocket artillery support for armoured formations. They had a crew of three and most of the conversions were made by Opel.

GERMANY

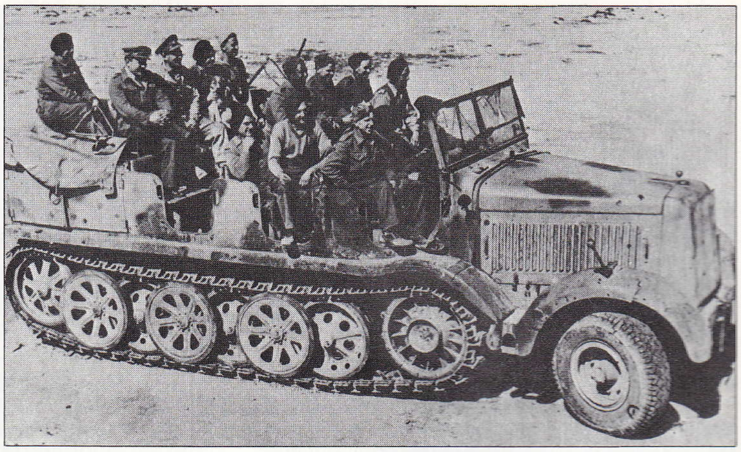
SdKfz 8 schwerer Zugkraftwagen 12t

As has already been mentioned, the SdKfz designation followed no logical sequence and the **SdKfz 8 schwerer Zugkraftwagen 12t** was actually the first of the German halftracks to be developed and produced. It consequently established many of the features and design details that were later to be used on other German halftrack designs. The line of development that led to the SdKfz 8 can be traced back to World War I, when Daimler-Benz was involved in some early halftrack design work, one result of which was an advanced vehicle known as the **Marienwagen**. After 1919 Daimler-Benz continued its development work, bringing out a series of vehicles, one of which attracted the attention of the Red Army (in 1931 there was even talk of a Soviet production order). This appears never to have come about, for instead the German army ordered a model known as the **Daimler-Benz DB S 7**. Later versions followed the general layout of this 1931 vehicle, but gradually more powerful engines were fitted until the series reached the **Daimler-Benz DB 10**.

The SdKfz 8 was designed as an artillery tractor, and an artillery tractor it remained throughout its service life. There was only one variation, a 1940 conversion of what was probably only one vehicle to mount an 8.8-cm (3.46-in) Flak 18. This was used in action in France in May 1940, and thereafter no mention of this offshoot can be found. The SdKfz 8 remained in production until 1944 as an artillery tractor. Originally it was produced to tow two modernized ex-World War I artillery pieces, the 15-cm (5.9-in) K 16 and the 21-cm (8.27-in) lange Mörser, a stubby howitzer. As more modern equipment came into use the SdKfz 8 switched to towing weapons such as the heavy 8.8-cm Flak 41 and the even larger 17-cm (6.7-in) K 18 long-range gun. The SdKfz 8 was also used by the Luftwaffe to tow the ponderous 10.5-cm (4.13-in) Flak 38 and 39 anti-aircraft guns. At times these tractors were called upon to tow tank-carrying semi-trailers or other forms of heavy trailer, but usually the artillery batteries retained their vehicles jealously.

By late 1942 there were 1,615 SdKfz 8s in service. Production was concentrated at two main centres, the Daimler-Benz works at Berlin-Marienfelde and the Kruppwerke at Mülhausen. At one time some production work was also carried out the Skodawerke at Pilsen, and in the years after the war the new Czech army used a large number of SdKfz 8s, some of them lasting until well into the 1960s.

One variation of the SdKfz 8 was a vehicle known as the **HK 1601**. This differed from the normal Sdkfz 8 in many ways and was an attempt to combine the features of the large 18t halftracks and the SdKfz 8. The prototype appeared in late 1941 and after three more had been built it was decided to produce a batch of another 30. These were apparently built and used on the Eastern Front. They had a cargo-type body to carry the crew of 13. Production of the SdKfz 8 ceased during 1944.



A group of assorted British soldiers take advantage of a ride on a captured SdKfz 8 schwerer Zugkraftwagen 12t, somewhere in North Africa. The normal capacity of this vehicle was 13 men, but it has been exceeded here. This is the basic artillery tractor version of the SdKfz 8.

Specification
SdKfz 8
Crew: 13
Weight: 15000 kg (33,069 lb)
Powerplant: one Maybach HL 85 12-cylinder petrol engine developing 138.0 kW (185 hp)
Dimensions: length 7.35 m (24 ft 1.4 in); width 2.50 m (8 ft 2.4 in); height 2.81 m (9 ft 2.6 in)
Performance: maximum road speed 51 km/h (31.7 mph)

GERMANY

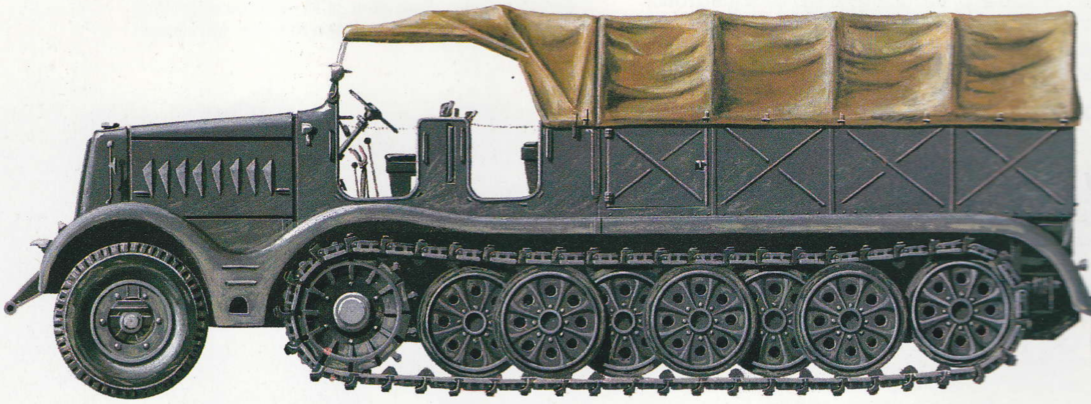
SdKfz 9 schwerer Zugkraftwagen 18t

By far the largest of all the World War II halftracks was the mighty **SdKfz 9 schwerer Zugkraftwagen 18t**, a vehicle that had its origins in a requirement made during 1936 for a heavy recovery vehicle to support the Panzer formations and tow disabled tanks. The development contract was awarded to the Famo Fahrzeugwerke und Motorwerke AG at Breslau, which became the sole producer. The first example appeared in 1936: this was the **FM gr 1**, and later came two other models, the **FM gr 2** and **FM gr 3** which used larger and more powerful engines.

In the end both tractor and recovery versions of the SdKfz 9 were produced. The tractor version was the basic SdKfz 9, which was used to tow the German army's really heavy artillery weapons and some heavy engineer equipment including bridging (for which there was a tractor unit towing bridge units on special trailers and carrying 15 men). Among the heavy artillery towed by the SdKfz 9 was the 24-cm (9.45-in) K 3 (so large it had to be towed in five loads), the Krupp 21-cm (8.27-in) K 38, and the various Skoda heavy howitzers and guns. The Luftwaffe used a small number of tractors to tow the mobile versions of the super-heavy 12.8-cm (5.04-in) Flak 40. An anti-aircraft gun was used on the only weapon-carrier version of the SdKfz 9 which appeared in 1943. This variant carried a 8.8-cm (3.46-in) Flak 37, and the vehicle had an armoured cab. The sides of the rear firing platform could be folded down to act as a working platform for the gun crew, and there were small outrigger arms to stabilize the vehicle in action. Only one conversion was made.

The recovery versions appeared in two forms, the **SdKfz 9/1** and **SdKfz 9/2**. The sdKfz 9/1 had a crane (*Drehkran*) with a 6000-kg (13,228-lb) lifting capacity, but this was insufficient for some lifting tasks and the SdKfz 9/2 was produced with a 10000-kg (22,046-lb) crane. Outrigger legs were fitted on the latter, and an extra jib was provided to suspend a counter-weight when really heavy loads were to be lifted. These vehicles were massive equipments, and although they were capable of dealing with tanks up to the size of the PzKpfw IV they could not handle the heavier Panthers and Tigers. Since the SdKfz 9 was the only recovery vehicle in use when these 'heavies' entered service, a way had to be found and the type was used in sections of three vehicles, at least two being needed to recover Tigers from some situations. In order to provide them with more traction some were fitted with a large earth spade at the rear, but even so two vehicles still had to be used to drag a Tiger out of a ditch, and sometimes three to tow one in a disabled state. The only answer to that was to develop a heavy tracked recovery vehicle, which duly appeared as the Bergepanther.

Production of the SdKfz 9 ceased during 1944, by which time the last versions were powered by the same Maybach engines as those fitted to PzKpfw IV tanks. They were massive vehicles that were certainly impressive to look at, but one has to bear in mind that the basic tractor version cost 60,000 Reichsmarks: a Panther cost 117,100.



The SdKfz 9 schwere Zugkraftwagen 18t was the largest of the German halftracks and was used to tow heavy guns and similar equipment, mainly as a recovery vehicle, some being fitted with cranes and jibs for this role. This example is a heavy artillery tractor and could carry nine men.

Specification
SdKfz 9
Crew: 9
Weight: 18000 kg (39,683 lb)
Powerplant: one Maybach HL V-12 petrol engine developing 186.4 kW (250 hp)
Dimensions: length 8.25 m (27 ft 0.8 in); width 1.60 m (8 ft 6 in); height 2.76 m (9 ft 0.7 in)
Performance: maximum road speed 50 km/h (31 mph)
Armament: none

Operation 'Cobra'

By July 1944 Allied euphoria at the success of D-Day had largely worn off, with the tenacious German defence seemingly impervious to all attempts to break out. Operation 'Cobra' was designed to smash the front open and release Patton's tanks in hot pursuit.

A rare sight indeed: bitter rivals George Patton (left) and Sir Bernard Montgomery (right) smile at each other in front of Omar Bradley (centre). Despite their differences the breakout from Normandy was well co-ordinated, Montgomery drawing the enemy to him before Bradley launched his assault.

At the end of June 1944 there were many seriously worried men in Whitehall and Washington, men whose whole attention had been concentrated for months (in some cases years) upon the successful liberation of Europe from Hitler's domination, and who now suspected that their plans were going awry. On 6 June the Allied armies had stormed ashore in Normandy as part of the greatest amphibious operation in the history of warfare, and during those first, heady days had secured such apparent success as to raise the hopes and banish all doubts. Now the hopes were lower, the doubts back and growing.

At the eastern end of the beach-head the British 2nd Army under Lieutenant-General Sir Miles Dempsey was still edging its way forward towards Caen, one of its earliest objectives, while at the western end the US 1st Army, under Lieutenant-General Omar Bradley, had captured the vital port of Cherbourg on 29 July, but was still caught in a nightmare of frustration by the *bocage* country of small fields bordered by high banks and hedgerows, liberally sewn with hidden German machine-guns, mortars and anti-tank weapons.

The invasion programme was thus well behind schedule, for by this time the planners had hoped that the Allied armies would be in possession of the whole of Normandy, and to have established 62 squadrons of fighters and bombers on 27 airfields. All they had taken, in fact, were 17 airfields supporting only 31 squadrons, contained in less than a quarter of the area that it had been hoped the Allies would hold by this time.

Montgomery's plans

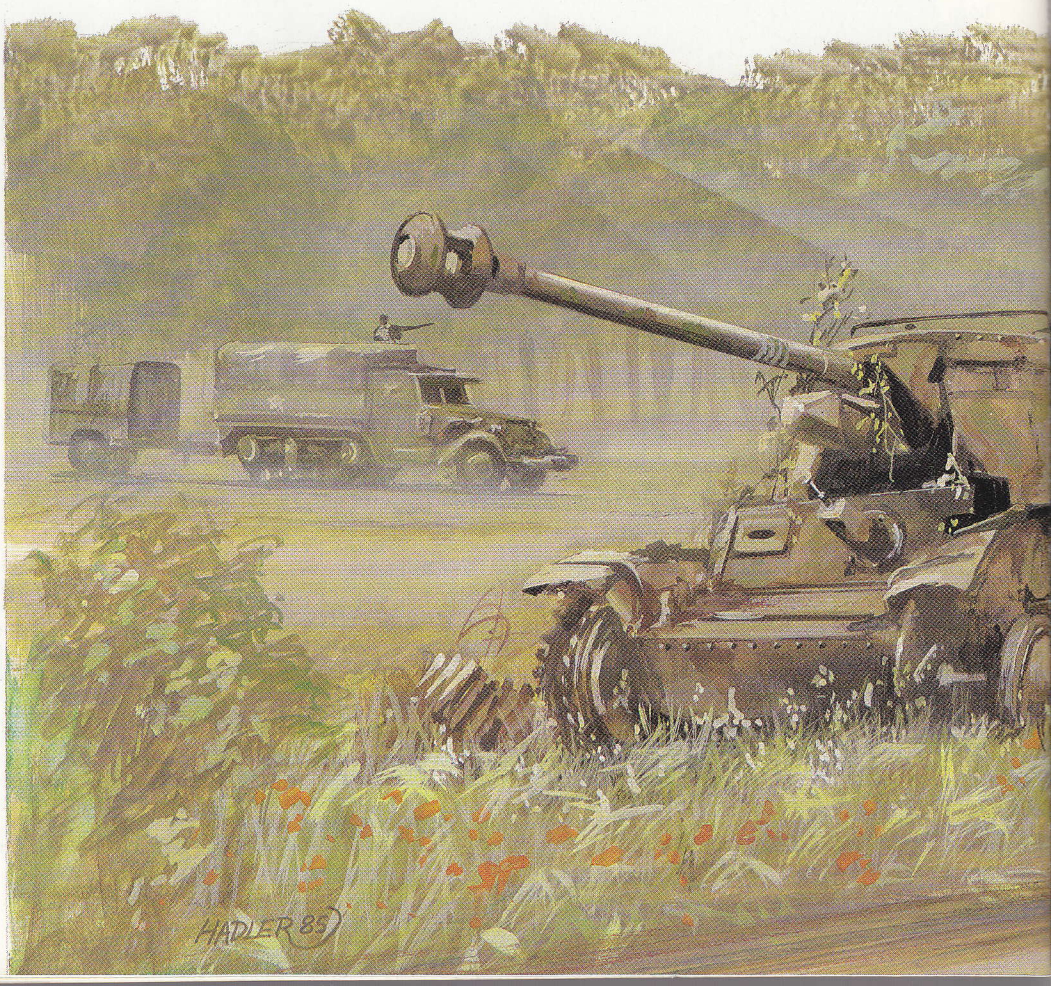
But there was an exception among these downcast Allied leaders, the man in command of the formations actually engaged in the fighting, General Sir Bernard Montgomery, whose rocklike confidence provided balm to those who believed in him and was a source of deep annoyance to the many who did not. The believers were right. As early as 11 June Montgomery had stated that his objective was to draw the greatest possible weight of enemy forces on to the eastern end of the bridgehead, i.e. towards Dempsey's forces aimed at Caen, thus weakening the opposition in front of Bradley's forces until the time came when they could break out, first to occupy the whole of the Cotentin peninsula, then to cross the Selune river just south of Avranches and release the US 3rd Army under the flamboyant Lieutenant-General George Patton, to flood out to the west and take the whole of Brittany and the vital ports of Brest, Lorient and St Nazaire.

And to the delight of Montgomery's friends, the grudging approbation of his enemies, and the relief of all, by the end of July all this seemed possible. On 24 July Bradley had launched Operation 'Cobra', and four days later the American tank crews were out of the *bocage*, their infantry holding a line from the Cotentin coast eastwards through Coutances, Roncey and St Lô; and on 30/31 July they swept into Avranches to cross the Selune river with Brittany (and as it happened the whole of north west France) open to them. It was enough to cause Major-General Leland Hobbs, commanding the US 30th Division, to deliver himself of the excited comment 'This thing has busted wide open. We may be the spearhead that broke the camel's back!'

Patton was equally excited, especially as on the morning of 1 August his 3rd Army became officially operational, though his own presence in Europe, for reasons which now seem curiously unreal, was not yet officially acknowledged except by the Germans, who had known about it for days.

Patton's position before 1 August had been somewhat equivocal, for the US VIII Corps under Major-General Troy Middleton was really a part of Patton's 3rd Army but had been loaned to Bradley's 1st Army for the invasion. This was the corps on the western flank of 'Cobra' which had swept down the Cotentin coast to take Avranches and cross the Selune, and on 28 July, Bradley had asked Patton to assume responsibility for VIII Corps area as 'Deputy Army Commander', despite the fact that Patton was not supposed to be in Europe, and was officially commander of the 3rd Army.

But at noon on 1 August, all this changed. Patton was now in undisputed command of four



Patton's 3rd Army surged forward as Operation 'Cobra' smashed a yawning gap in the German defences. Bypassing enemy strongpoints, Patton's units were instructed to advance at top speed without worrying about protecting their flanks. It was this boldness that led Feldmarschal von Rundstedt to rate Patton as the most dangerous of the Allied commanders.

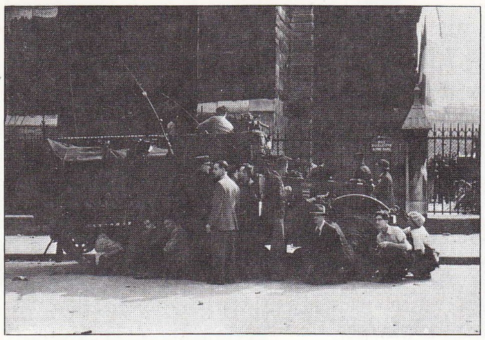
corps (VIII, XIII, XV and XX) containing eight infantry and four armoured divisions, under operation orders issued before D-Day, and confirmed by Montgomery on 27 July and by Bradley that morning; his first and prime task would be to liberate Brittany and its vital ports as quickly as possible. It was typical of Patton that hardly had he swallowed the drink celebrating his assumption of command than he had seen chances of far wider objectives for his divisions and requested permission to exploit them, but began putting them into operation without awaiting reply.

Looking eastwards

Instructing the armoured divisions of Middleton's VIII Corps to race straight for Brest, Vannes and Lorient without worrying about their flanks or anything except their speed, he turned away from the Atlantic and directed his attention eastward to the gap between Chartres and Orléans, over 160 km (100 miles) away, beyond which lay the Seine; on the Seine lay Paris, and Patton, an ardent Francophile, purposed to be the first Allied commander to reach the French capital.

By now XV Corps under Major-General Haislip was forming just south of the Avranches gap in order to hold enemy pressure off the hinge of Middleton's corps and in theory to protect its left flank, but as the divisions came up, either by accident or design they faced east, away from Brittany and towards the heart of France. The gap between Mayenne and Laval on the Mayenne river beckoned, and by 4 August both Bradley and Montgomery had reached the same decision as Patton. 'The main business,' proclaimed Montgomery, 'lies to the east.' And as Haislip's XV Corps prepared to crash through the Mayenne-Laval gap, Patton threw his XX Corps under Major-General Walker even farther south, aimed at Angers and the passage east along the north bank of the Loire.

Haislip's XV Corps moved first, on 5 August, and by 8 August was not only across the Mayenne but had reached Le Mans 65 km (40 miles) on; Walker moved on 7 August, took Angers on 11 August and raced forward to cover Haislip's flank towards the Chartres/Orléans gap, moving at 25-32 km (16 to 20 miles) per day. It was all very exciting, but it must be remembered that compared to the battles farther north, the 3rd Army was advancing into a partial vacuum; what little opposition the Americans found they bypassed.

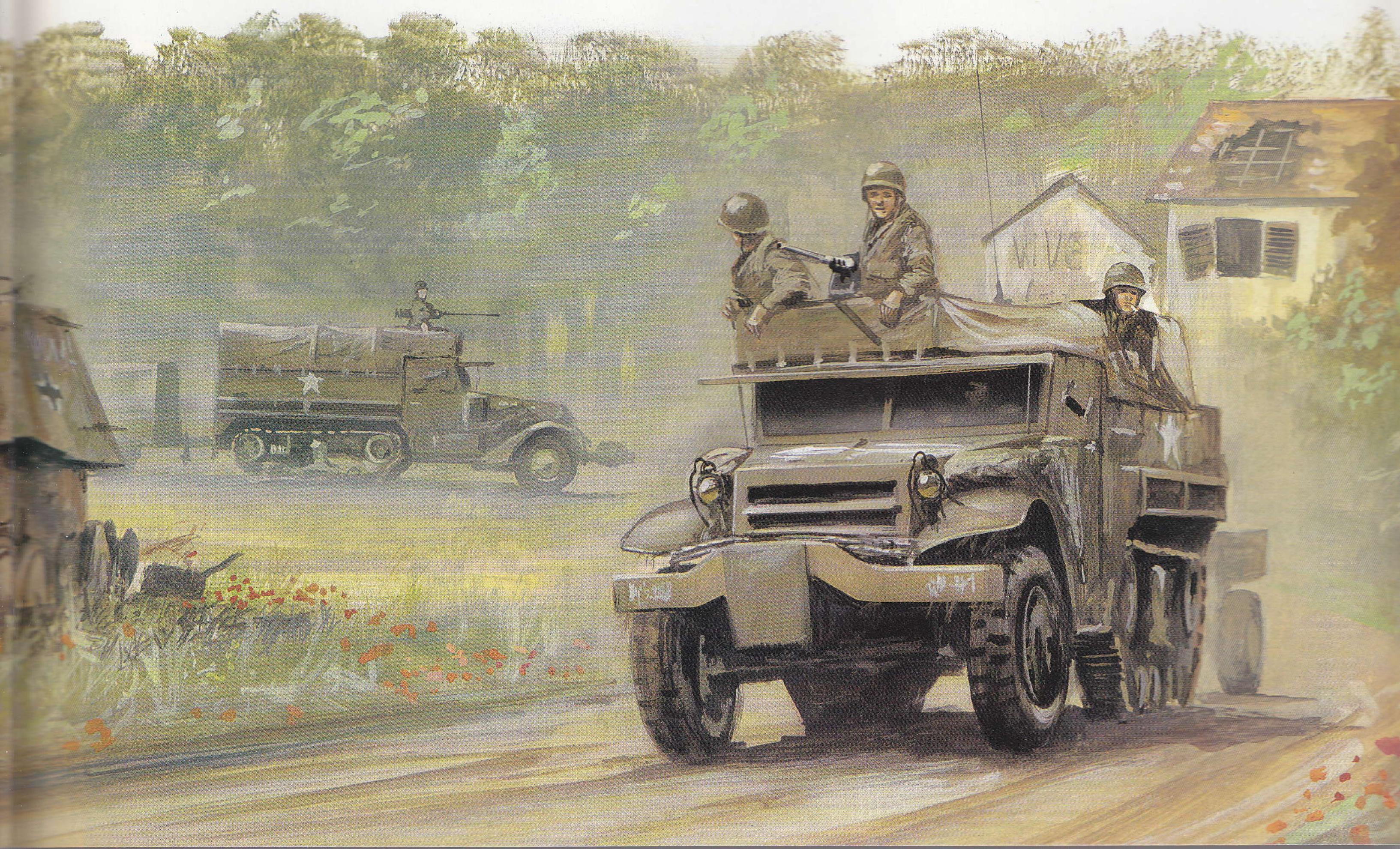


By general agreement the Free French under General Leclerc took the lead in liberating Paris, and this M3 was one of the first vehicles into the city. However, some collaborators decided to oppose the entry, and here a group of welcoming Parisians use an M3 for cover against snipers.

An M4 Sherman of 7th Armoured Division, the 'Desert Rats', leads a Cromwell tank toward German positions near Plessis-Grimoult, 8 August 1944. In the early days of August, the Allied armies desperately sought to close the Falaise gap and trap the German forces in Normandy.

Patton split his command into comparatively small combat units: reconnaissance teams in their jeeps and fast halftracks probing continually ahead, tanks close behind, lorries and

To maintain the pace of its headlong advance, the 3rd Army needed vast quantities of petrol. This was obtained by all manner of expedients and the fuel assigned to other units was considered fair game. The fuel was then rushed to the front in any available vehicle; M3s, with their cross-country capability, were in particular demand.



infantry carriers in support. It soon became more a matter of logistics than of battle, for the rate at which the 3rd Army was advancing needed about 950,000 litres (250,000 US gal) of petrol per day, all rushed forward in anything which could move, particularly anything fast and capable of moving across country without choking the already packed roads. M3s were in constant demand for the task.

But there now occurred a slight check on the onward rush. Other eyes than Montgomery's and Patton's were watching strategic developments, and whatever the Wehrmacht generals might prescibe, Hitler was still in command. Generalfeldmarschall Günther von Kluge might recommend a rapid withdrawal of all German forces to behind the Seine and the water-barriers of the Somme and the Meuse, but Hitler's eyes were on that narrow gap between Mortain and Avranches though which all Patton's supplies must be fed. On 4 August four Panzer divisions of General Paul Hausser's 7th Army struck eastwards through Mortain and was 11.3 km (7 miles) on towards Avranches before it was stopped as Bradley, now commanding the 12th Army Group, sensed the danger and threw in two corps from the US 1st Army.

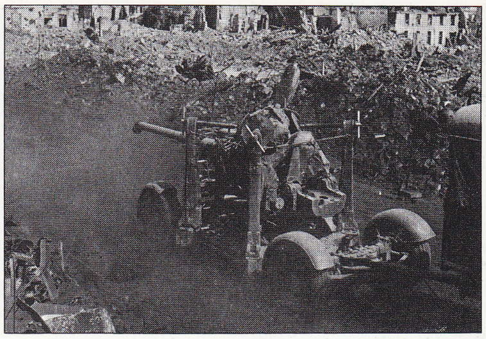
There was bitter fighting, but Avranches remained inviolate. But now two German armies and a Panzergruppe (nearly 100,000 men) were concentrated west of a line running south from Falaise to Alençon, while Dempsey's British and Canadians were a few miles north of Falaise and Haislip's tanks were at Le Mans. It needed no great imagination to see what would happen if they were to meet, and Montgomery was playing it cool when he said 'If we can close the gap completely, we shall have put the enemy in the most awkward predicament.'

The Falaise Gap was not closed with total effectiveness, though the destruction of German equipment and their loss of some 60,000 men was a severe blow; but Haislip's XV Corps did not reach Argentan on 13 August and could probably have gone on to Falaise had not demarcation lines and poor liaison prevented it. XV Corps was ordered instead to form the southern shoulder of the gap. But Patton was not pleased to hear that one of his corps had been allotted a purely static role. Moreover, he did not feel that the whole corps was needed at Argentan, so on the following day he sent two XV Corps divisions off to join the race eastwards again, aimed first for Dreux which they reached on 16 August.

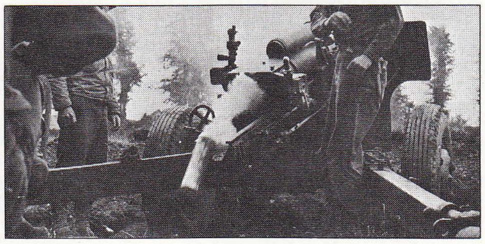
To the south of them, Walker's XX Corps had the same day reached Chartres while by another feat of organization Patton had fed in his fourth corps (XII Corps under Major-General Manton S. Eddy) even farther out on the right flank to take Orléans. Some 483 km (300 miles) now separated the farthest-flung divisions of Patton's 3rd Army (Middleton's men at Brest and Eddy's at Orléans) and the gap was to widen even farther. Haislip's men left Dreux on 16 August and reached Mantes-Gassicourt on 19 August, Walker's XX Corps left Chartres on 16 August to reach Melun and Fontainebleu on 20 August (thus XV and XX Corps cut the Seine both above and below Paris almost simultaneously) and Eddy's XII Corps drove into Sens from Orléans on the afternoon of 21 August.

In 21 days, therefore, Patton's 3rd Army had advanced eastward from Avranches 322 km (200 miles) to the Seine, and westward 241 km (150 miles) to Brest. The Americans had liberated some 116550 km^2 (45,000 sq miles) of France, and played a significant part in the destruction of the immense German forces trapped in the Falaise pocket.

This was a considerable military achievement by any standards and, in terms of logistics, a classic.

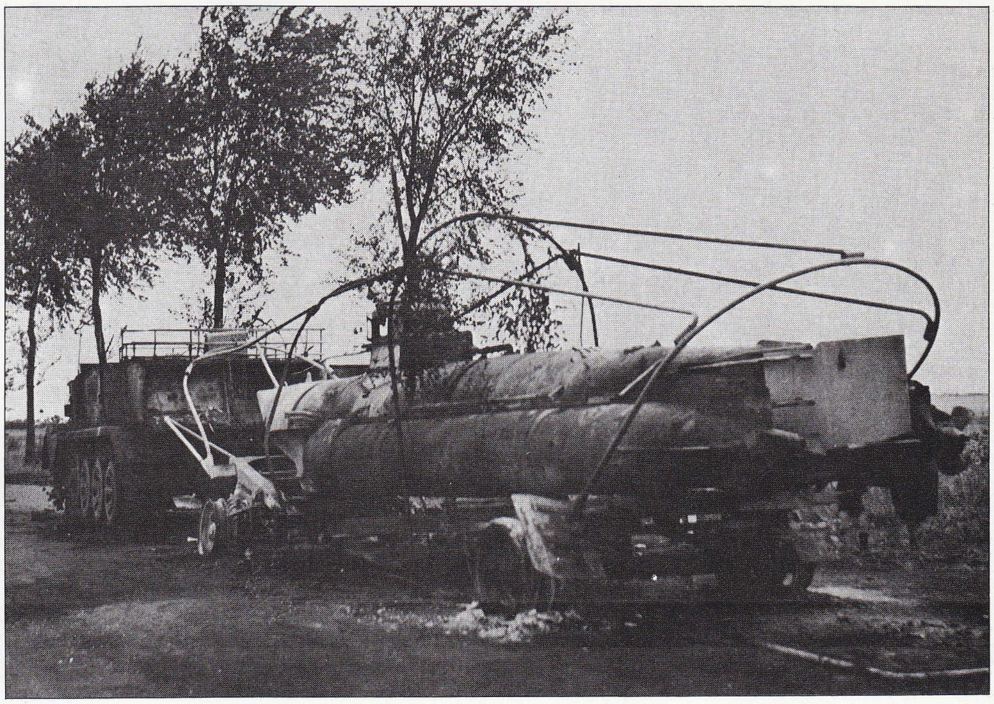


Above: A British 94-mm (3.7-in) AA gun is towed through the streets of Caen. Carpet-bombing of the German-held city created almost as many problems as it solved, choking the streets with rubble.



Left: A US 105-mm howitzer is seen in action against German positions in Normandy. The German lines were punctured only after sustained bombardment by artillery of all calibres and massive air strikes had prepared the way.

An M10 tank destroyer advances confidently down the Caen road during the build up to Operation 'Cobra'. Caen proved a difficult objective, but once the mechanized Allied armies broke into open country Hitler's rigid defensive strategy spelt doom for the Wehrmacht in France.



An SdKfz 7 tractor tows, of all things, a Biber miniature submarine. It was caught in an Allied air strike during the retreat from Normandy in August 1944 when the cover and the trailer were both burned out, leaving the combination to be captured by the advancing Allies.

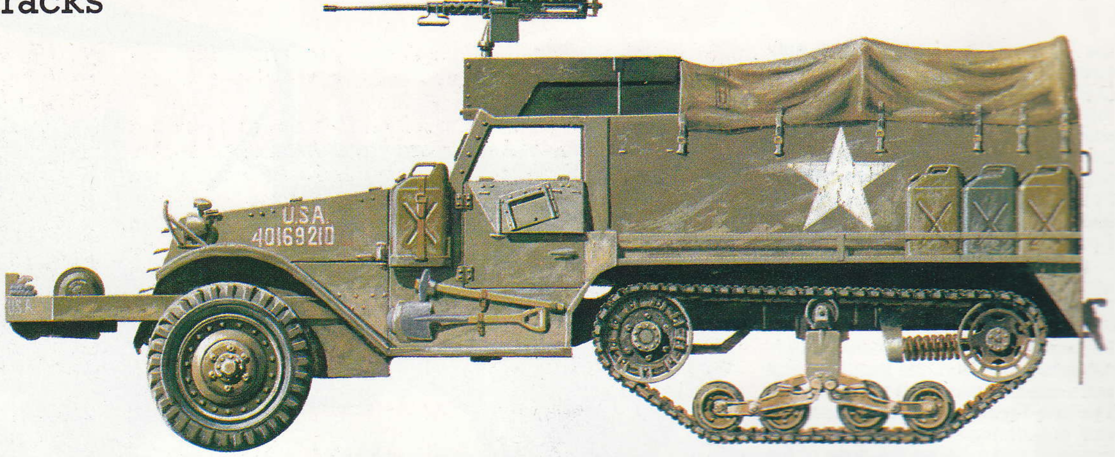
USA

American halftracks

It is difficult to condense the entire story of the American halftrack into a few hundred words, for to even list the number of types would probably fill this study. The American halftrack development history started during the 1920s, when some Citröen-Kégresse halftracks were purchased, and subsequent trials led to a long series of development models before the hull of the White Scout Car M2 was allied with a Kégresse halftrack suspension and the 'classic' American halftrack emerged as the **Half-Track Car M2** that went into production in early 1941, the first examples reaching the troops in May of that year.

Thereafter the halftracks rolled off the assembly lines in their thousands. It would be easy to say that most of them were personnel carriers, but also included in the totals were mortar carriers, multiple gun motor carriages, gun motor carriages, trucks and a vast array of experimental types of all kinds. All manner of weapons were hung upon the basic halftrack chassis at one time or another but among those that were used in action were 57-mm (2.244-in) anti-tank guns, 75-mm (2.95-in) field guns and even 105-mm (4.13-in) howitzers. Anti-aircraft versions carried varying multiples of 12.7-mm (0.5-in) machine-guns, 20-mm cannon and 40-mm Bofors guns. Combat engineer equipment was another widely carried load (each model had racks along the sides to carry anti-tank mines).

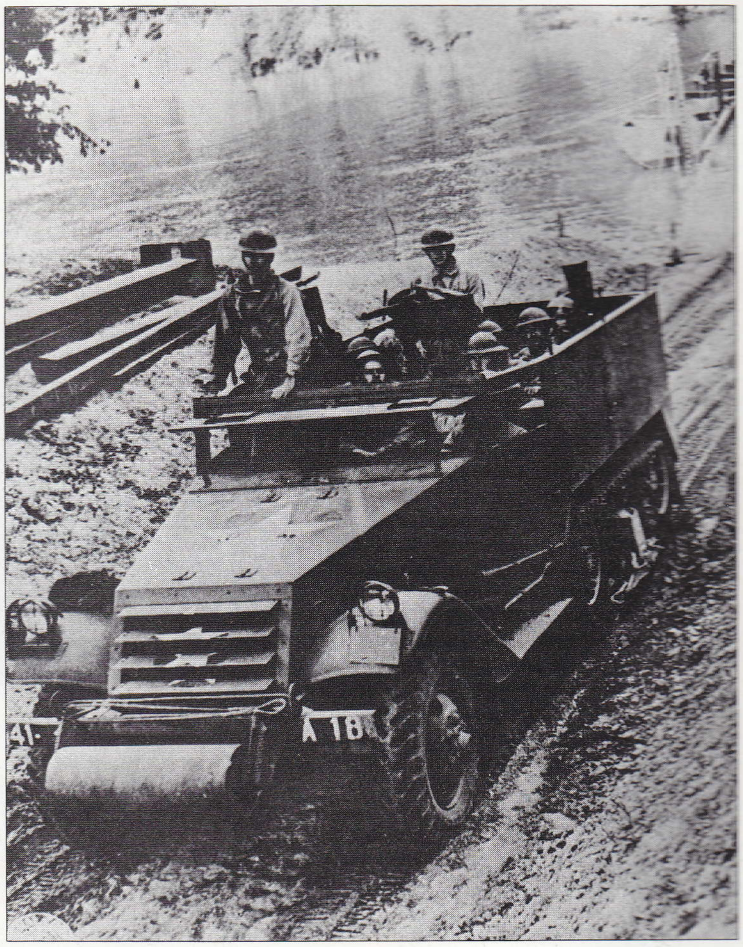
It was the personnel carriers that were the most widely used, and in several versions. The early M2 was supplemented by the later **Half-Track Personnel Carrier M3** which could also be used as a communications vehicle, an artillery tow vehicle, and as an armoured ambulance. The even later **Half-Track Personnel Carrier M5** differed in production methods and there was also a **Half-Track Car M9**. Seating varied between models from 10 to 13, and there were various dispositions of machine-gun mountings. The usual arrangement was a 12.7-mm Browning at the front on a large ring mounting and a 7.62-mm (0.3-in) Browning on a pintle at the rear. To this could be added the weapons of the carried troops, and the picture of halftracks firing away as they went into action is complete. It now seems impossible to visualize troops operating in Europe in 1944 and 1945 without halftracks somewhere in the picture, for the Americans issued halftracks of all kinds to their Allies, including the British who started to use American halftracks even before the fighting in North Africa ended. Production of halftracks was some 41,170 units.



Above: The American M3 halftrack was such a widely used vehicle that it became a virtual trademark of the US Army and other Allied forces, including the Red Army. This M3 is complete with the canvas tilt, a forward-mounted winch and the 'pulpit' machine-gun mounting, here with a 0.50-in (12.7-mm) Browning.

After the war the halftrack story did not end, and even now is still not over for the halftrack in several forms is still a front-line vehicle for the Israel Defence Forces. Re-engined and refurbished for the umpteenth time, halftracks continue to be used by the mechanized formations of the Israeli army although most have now been relegated to the Reserve forces. Other armed forces still use halftracks, but now the most common use is as a recovery vehicle, a role that commenced during World War II with the Allied forces. It should not be forgotten that during World War II one of the halftrack user nations was the Soviet Union, for large numbers were shipped there from 1942 onwards. Rumour has it that some still survive with some of the smaller Warsaw Pact nations.

Specification
M3
Crew: 13
Weight: 9299 kg (20,500 lb)
Powerplant: one White 160AX 6-cylinder petrol engine developing 109.6 kW (147 hp)
Dimensions: length 6.18 m (20 ft 3.5 in); width 2.22 m (7 ft 3.5 in); height 2.26 m (7 ft 5 in)
Performance: maximum road speed 64.4 km/h (40 mph); range 282 km (175 miles); gradient 31°; fording 0.81 m (32 in)
Armament: one 12.7-mm (0.5-in) machine-gun and one 7.62-mm (0.3-in) machine-gun



An early shot of the M2 halftrack, taken when the US Army was still using the World War I helmets and equipment. This vehicle still has the original centre-mounted machine-gun mount for a 0.30-inch (7.62-mm) Browning machine-gun, and lacks the side racks for anti-tank mines that were often fitted to operational vehicles.

FRANCE

Unic Kégresse P 107

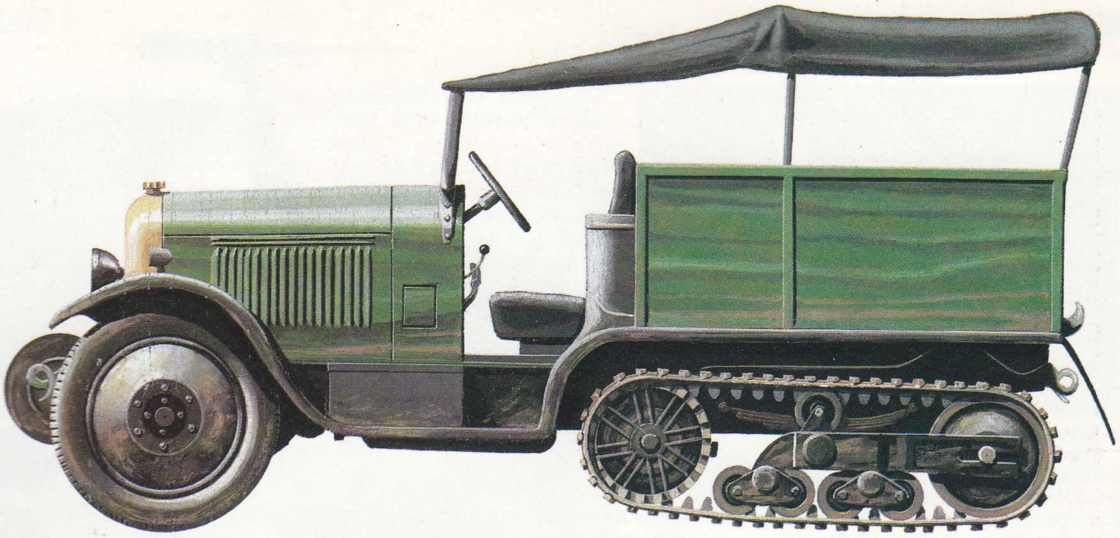
Some confusion still remains as to the actual manufacturer of the French halftrack known as the **P 107**. Some references state it was produced by the Unic concern while others refer to this vehicle as the Citröen-Kégresse P 107. The truth is that both companies produced the P 107, Citröen having what may now be described as the design parentage. Citröen employed Kégresse for some years after the engineer's return from Russia to France, and accordingly Citröen produced a long string of half-track designs using the Kégresse rubber-based track under the Citröen-Kégresse label. The P 107 was but one of these designs, and the first of this type appeared during the late 1930s. The P 107 went on to be among the more numerous of the many French halftracks.

The P 107 was produced in two forms. One was an artillery tractor for light field pieces and anti-tank guns. This version had a soft top covering the space for the crew of from five to seven men, and lockers at the rear for ammunition and other supplies. The second version, produced in smaller numbers, was an engineer tractor. This had an open cargo body behind the cab and was used to tow trailers carrying combat engineer equipment such as bridging pontoons. By 1939 both types were in French army service in some numbers. Both were sound and reliable vehicles and the demand for them was such that both Unic and Citröen had production lines devoted to them, hence the confusion in name.

The events of May 1940 caused a change of ownership for the P 107s. Large numbers of both types of vehicle fell into German hands and they had another change of name, this time to **leichter Zugkraftwagen U 304(f)**. Always short of halftracks, the German army took the type into immediate service and the French halftracks that had one towed French anti-tank guns were used to tow German weapons such as

Unic Kégresse P 107 (continued)

the 3.7-cm (1.456-in) Pak 35/36 anti-tank gun and later the hybrid 7.5-cm (2.95-in) Pak 97/38. But not content with this use the Germans decided to go one better. Deciding that the P 107 fell into the same category as the SdKfz 250 series, the Germans converted the French vehicles to become substitute **leichter Schützenpanzerwagen**. The French vehicles were stripped of their superstructures and fitted with armoured hulls almost exactly like those of the SdKfz 250 series and when completed they were used in exactly the same way as their German counterparts (apart from the fact that some were used as armoured ambulances). The one 'French' feature the Germans did not change was the forward-mounted roller under the nose of the vehicle. This was used to assist the vehicle in and out of ditches and similar obstacles and proved so useful it was not removed. Most of these conversions were retained for use in France by the units based there, and many were used during the fighting in Normandy in June 1944. Some of the original tractors were also encountered, so not all the P 107s underwent the armoured conversion.



Above: this little Citroën-Kégresse five-seater was one of many French light halftracks that were used during the 1920s to develop the Kégresse rubber-based track. Many of these light halftracks were still in use in 1939, mainly as staff cars.

Specification
P 107
Crew: 5-7
Weights: empty 2350 kg (5,181 lb); loaded 4050 kg (8,929 lb)
Powerplant: one 4-cylinder petrol engine developing 41.0 kW (55 hp)
Dimensions: length 4.85 m (15 ft 10.9 in); width 1.80 m (5 ft 10.9 in); height 1.95 m (6 ft 4.8 in)
Performance: max road speed 45 km/h (28 mph); range 400 km (248.5 miles)
Armament: none

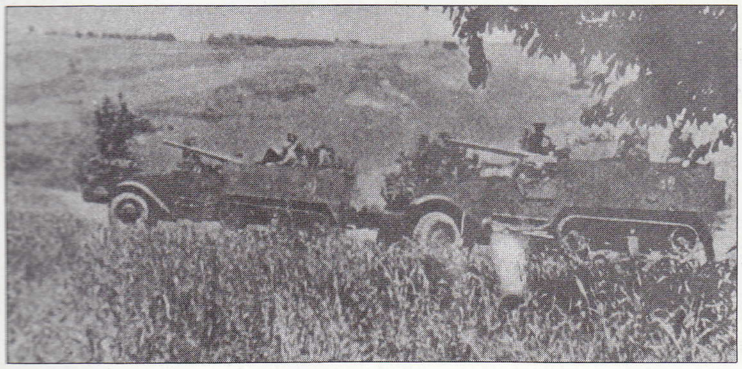
USSR

Soviet halftracks

For various reasons the Soviet Union did not make great use of halftracks during World War II other than employing American halftracks supplied to them under Lend-Lease. One of the main reasons for this was the relative cost in expense and production facilities that the halftrack demanded, and as the Soviet Union already had a large and productive full-tracked tractor industry geared to the requirements of the various agricultural Five-Year Plans, tracked tractors were frequently used for artillery when halftracks might otherwise have been considered.

This suggests that the Soviets were not interested in the halftrack concept, but they were. They recognized the strength of their mobility and handling advantages, and in 1931 considered the purchase of 12-tonne halftracks from Germany. At that time their interest was such that two indigenous designs were placed into limited production. These were the **YaSP** and the **Zis-33** trucks converted to the halftrack configuration, and later also used as artillery tractors. The YaSP was produced at Yaroslavl and was a Ya G-5 Komits truck fitted at the rear with a halftrack suspension (derived from the track system of the T-26 light tank) allied to a new drive shaft from the main engine at the front. The Zis-33 was a somewhat simpler vehicle that retained the main rear drive wheel allied to a halftrack suspension, and was built using the Zis-5 truck.

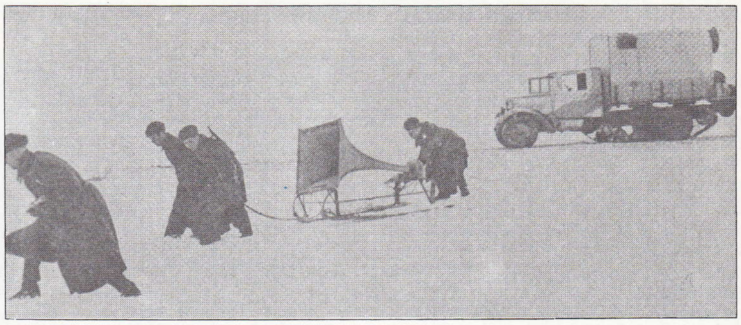
The relative success of these two design ventures engendered more during 1936. Most of these did not get very far. One was the **VM Pikap**, a version of the Zis-6 light truck. In 1937 more models appeared, most of them intended for the artillery tractor role. They included a 1¼-ton model (the **Vezdekhods Model B**), a 1½-ton model (the **BM**) and a 2-ton model (the **VZ**). As far as can be determined only the latter two models actually got to the production stage, and again they were halftrack conversions of existing trucks.



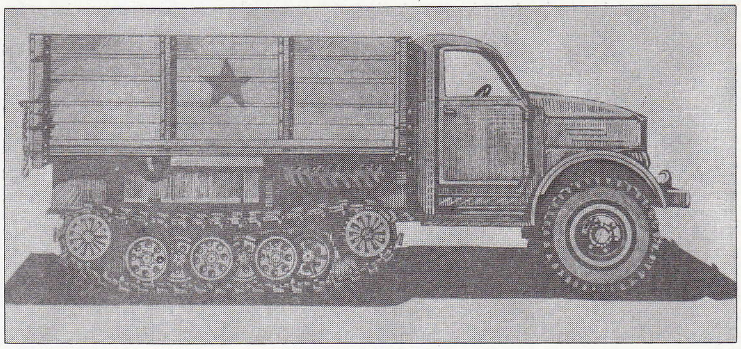
Left: The Soviets made extensive use of US M3 halftracks supplied under Lend-Lease, modifying them for their own use. Here two M3s of the Red Army are seen fitted with 76.2-mm (3-in) guns as improvised tank destroyers, an arrangement the US army also experimented with.

By the time 1941 came around the Soviet armed forces had few halftracks in service compared with the number of wheeled or fully-tracked vehicles. Many of what they did have were soon lost during the German advances of 1941, and all captured German halftracks were pressed into Soviet use. The Red Army soldiers soon learned how useful these were, and from 1942 onwards there was a deliberate programme to make use of even damaged German halftracks. Hulks were salvaged from battlefields and stripped of all useful items, especially the running wheel, tracks and drive components. These were taken to the GAZ plant in the Urals where they were allied with GAZ-63 trucks to form **GAZ-60** troop carriers. The GAZ-60 used all manner of German components, the most favoured being those from the SdKfz 251 series of vehicles. Few of these wartime expedient vehicles survived the war years.

One other known Soviet halftrack produced during 1942 was known as the **Zis-42**. It was a 2½-ton semi-tracked weapons carrier, but no other details have survived so it does not appear to have been produced in quantity.



Below: One of the most successful Soviet pre-war halftracks, the Zis-33 was built on a truck chassis. This vehicle is seen with a propaganda unit broadcasting news of Red Army victories in the south to German positions in the north.



The Soviets made great use of captured German halftrack components to construct hybrids like this GAZ truck.